



HAEMATOLOGY AND SERUM BIOCHEMICAL CHARACTERISTICS OF BROILER FINISHER FED CASSAVA PEEL MEAL (CPM).

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Abstract

A 56-day study was carried out to evaluate the haematological and biochemical characteristics of broiler finisher fed cassava peel meal (CPM). Ninety six (96) day old chicks were used for the experiment. The birds were randomly divided into four (4) treatment groups with three replicates containing 8 birds each in a completely Randomized Design (CRD). The experimental diets were formulated to contain 0% cassava peel meal (T_1) control, 5% (T_2), 10% (T_3) and 15% (T_4) respectively. Feed and water were served ad-libitum throughout the experimental period. Data were collected for haematological and biochemical parameters analysis. Haematological parameters include RBC, WBC, PCV, Hb, MCHC, MCH and MCV, while serum biochemical parameters include urea, total protein, albumin, globulin, creatinine, cholesterol, and glucose. Result of the biochemical parameters showed that urea, cholesterol and albumin showed significant ($P < 0.05$) differences, while creatinine, glucose, globulin and total protein showed non-significant ($P > 0.05$) differences. Results of haematological parameters showed non-significant ($P < 0.05$) differences in all the parameters studied. The inclusion of processed CPM was not deleterious to the birds.

Keywords: Haematology, Blood Chemistry, CPM and Broiler Finisher

Introduction

Profitability in the rearing of poultry birds like any other livestock in Nigeria as in other developing countries is influenced by a combination of various inputs which are required to maintain faster growth rate as well as reduce feeding cost which constitutes the highest operational cost. High production cost resulting from feed is a major factor affecting the development of livestock industries in developing countries (Kaweet *et al.*, 2007). There is also a pressing need to explore the use of unconventional and local foodstuffs, which are underexploited by poultry farmers in order to reduce feed costs. There is increased interest by Nigerian livestock farmers and researchers to harness unconventional feed ingredients. Cassava peels like most agricultural wastes is made up of mainly polysaccharides which are widespread in nature, they account for an estimated 66% of all global bound carbon (Gardner, 1974). Cassava peel contains 27.9% dry matter, 5.3% crude protein and 1.2% ether extract. It is relatively high in crude fibre 20.97% and ash 5.93%. It contains 66.6% Nitrogen free extract (Omole and Sonaiya, 2000). The utilization will at the same time reduce the environmental pollution caused by this waste product. The great limitation in the utilization of cassava peel as substitute for maize is its high hydrocyanic acid (HCN) content which is toxic to monogastrics. The use of blood examination as a way of assessing the health status of animals has been documented (Muhammad *et al.*, 2000). The importance of hematological and biochemical parameters as diagnostic tools and physiological indicators in birds has been documented (Harr, 2002; Hauptmanova *et al.*, 2006). However, these parameters are greatly affected by sex, age and season (Fudge, 2000; Kecici and Col, 2011). The objective of this study is to evaluate the haematological and biochemical characteristics of broiler finisher fed cassava peel meal (CPM).

Materials and Methods

The research was carried out at the poultry project site of the Federal College of Agriculture, Ishiagu Ebonyi State. Cassava peel that was used as feed ingredient diet was procured from the college cassava milling unit. They were processed (sundried) and milled in a hammer mill with 2mm sieve to produce cassava peel



meal (CPM) that was used to compound the diet. Ninety six (96) day old chicks were used for the experiment. The birds were randomly divided into four (4) treatment groups in a completely randomized design (CRD) with three replicates containing 8 birds each. The experimental diets were formulated to contain 0% cassava peel meal treatment 1 (T₁) that is the control, 5% (T₂), 10% (T₃) and 15% (T₄) respectively.

Blood Collection for Hematological and Biochemical Analysis

At the end of the feeding trial, about 5mls of blood sample was collected for the analysis. The blood samples were taken from the wing vein of the bird using disposable needle and syringe. For haematological analysis, about 2mls used for analysis was stored in a bottle containing anticoagulant, ethylene diamine tetra acetic acid (EDTA) to prevent clotting and subsequently analyzed to determine RBC, WBC, PCV, Hb MCHC, MCH and MCV. While for serum biochemistry analysis, about 3mls was used. It was stored without anticoagulant, after coagulation it was separated and the harvested serum was used to determine the following parameters urea, total protein, albumin, globulin, creatinine, cholesterol, and glucose.

Data Collection and Analysis

Data collected for haematological and biochemical parameters were analyzed using analysis of variance (ANOVA) appropriate for (CRD) and treatment means were separated using Duncan multiple range test

Table 1: Experimental Diet Table

Ingredients	Treatments			
	T ₁ (0%)	T ₂ (5%)	T ₃ (10%)	T ₄ (15%)
Maize	55	50	45	40
Cassava Peel Meal	-	5	10	15
Soya bean	27	27	27	27
Fish meal	3.0	3.0	3.0	3.0
Palm kernel cake	11.80	13.8	11.30	11.30
Bone meal	2.5	2.5	2.5	2.5
Salt	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0.10	0.10
Methionine	0.10	0.10	0.10	0.10
Premix	0.25	0.25	0.25	0.25
Total	100	100	100	100

RESULTS AND DISCUSSION

Table 2: Serum Biochemical Indices of Broiler Finisher Fed Cassava Peel Meal

Parameters	Treatments				SEM
	T ₁ (0%)	T ₂ (5%)	T ₃ (10%)	T ₄ (15%)	
Urea (mg/dl)	18.94 ^a	12.15 ^{ab}	7.73 ^c	11.07 ^{ab}	1.46
Creatinine (mg/dl)	0.68	0.83	0.67	0.68	0.09
Cholesterol (mg/dl)	151.92 ^b	149.48 ^c	161.92 ^b	180.13 ^a	0.27
Glucose (mg/dl)	180.72	194.46	157.08	171.17	18.04
Albumin (g/l)	13.35 ^b	13.50 ^b	10.40 ^c	17.37 ^a	0.94
Globulin (g/l)	14.95	14.53	17.53	16.73	1.62
Total Protein (g/l)	28.30	28.00	33.95	33.83	2.06



a,b,ab,c Means within a row with different superscripts differ significantly ($p < 0.05$).

Table 2 above showed the biochemical parameters of broiler finisher fed cassava peel meal (CPM). Urea, cholesterol and albumin showed significant ($P < 0.05$) differences. Creatinine, glucose, globulin and total protein showed non-significant ($P > 0.05$) differences. Urea values were significantly ($P < 0.05$) influenced by the treatment diets with highest value (18.94 mg/dl) from 0% (CPM) followed by 5% (CPM) while the least value was recorded on birds 10% CPM. The result 7.73-18.94 (mg/dl) differs with that of Adeyemo and Sani (2013) that reported 19.82-54.80 (mg/dl) as they fed broiler with hydrolysed cassava peels as replacement for maize. Cholesterol and albumin values differs significantly ($P < 0.05$) higher in birds fed 15% CPM than other treatments. The range (149.48-154.49 mg/dl) differs from that of Egbunike *et al* (2009) (81.46-154.49 mg/dl) (1.42-3.40 mg/dl) for cholesterol and albumin respectively. The differences observed could be due the quantity and quality of feed and also the level of anti-nutritional elements or factors present in the feed Akinmutimi (2004), age etc. Almeida (2006) reported that at age 21, broilers had low cholesterol levels due to demand energy caused by higher body development. Biochemical parameters generally can be used to monitor protein quality of feeds, they are important in the proper maintenance of the osmotic pressure between the circulating fluid and the fluid in the tissue spaces so that exchange of materials between the blood and cells could be facilitated. They also contribute to the viscosity and maintenance of normal blood pressure and pH (Ladokun *et al.*, 2008).

Table 3: Haematological Characteristics of Broiler Finisher Fed Cassava Peel Meal

Parameters	T ₁ (0%)	T ₂ (5%)	T ₃ (10%)	T ₄ (15%)	SEM
RBC ($\times 10^{12}/l$)	3.73	3.94	3.82	4.02	0.18
WBC ($\times 10^9/l$)	8.77	6.93	7.60	8.80	0.16
PCV (%)	28.67	30.33	29.67	30.33	0.81
Hb (g/dl)	9.70	10.37	10.10	10.27	0.26
MCV (fl)	76.80	77.31	77.79	76.98	2.19
MCH (g/dl)	25.99	26.42	26.46	26.03	0.72
MCHC (%)	33.84	34.18	34.03	33.97	0.16

RBC=Red blood cell; WBC=White blood cell; PCV=Packed cell volume, Hb= Hemoglobin; MCHC=Mean corpuscular hemoglobin concentration; MCH=Mean corpuscular haemoglobin; MCV=Mean corpuscular volume.

Table 3 above showed the haematological characteristics of broiler finisher fed (CPM). The result revealed that all the parameters showed non-significant ($P > 0.05$) differences. Hb values obtained ranges from (9.70-10.37 g/dl). T₂ had the highest value of (10.37 g/dl), followed by T₄ (10.27) g/dl while T₁ had the least value of (9.70 g/dl). The Hb values obtained in this study were within the normal range of (7.0-13.0g/dl) reported for birds (Jain, 1993). Haemoglobin concentration of blood has been associated with availability of nutrients to the animal body (Esonu *et al.*, 2001). PCV values obtained were all within the normal range of 22-35 % reported by (Jain 1993). They were however lower than the values of 25 to 45% reported by Mirtuka and Rawnsley (1997). Broilers in T₃ recorded the highest values in MCV (77.79 fl), followed by birds in T₂ (77.31 fl), while T₁ had the least (76.80 fl). The MCV values obtained was below the normal range of (90 to 140 fl) reported by Mirtuka and Rawnsley (1997). Mean corpuscular volume is an indication of the average volume of blood cells (Lazzaro, 2003). WBC result ranges from (6.93-8.80 $\times 10^9/l$). T₃ gave the highest value, followed by T₁ and the least was in T₂. The result disagreed with the findings of Adeyemo and Sani (2013) that showed significant ($p < 0.05$) differences.

Conclusion

The study indicated that processed cassava peel meal could effectively be added to broiler ration to improve the quality of the feed and the performance of the animals. It also possess no threat to them, as all the values fall within the normal range for healthy birds.



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