Hematological and Serum Biochemical Parameters of Broiler finisher Chickens fed yam and Sweet Potato Peel Meals as Replacement for Maize

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ABSTRACT

An experiment was conducted to for eight (8) weeks to determine the replacement effect of yam and sweet potato peels meals for maize in broiler finisher diets on haematological and serum biochemical parameters.One hundred and eighty (180) birds were randomly allotted to five (5) treatment diets in a completely randomized design and raised separately in different pens. There were 36 birds in each treatment with three replicate and 12 birds per replicate. Feed and water were provided adlibitum. Five experimental diets were formulated and designated as T_1 (control) containing 0% yam and sweet potato peels (Maize – based), while diets T_2, T_3, T_4 and T_5 contained 2.5%, 5%, 7.5%, and 10% each of yam and sweet potato peel meals respectively . Data were collected on haematologicaland biochemical profile of the birds at the end of the feeding period (29-56 days). The data collected were subjected to analysis of variance (ANONA) using SAS (2010) Software. Differences between treatment means were separated using Duncan's New Multiple Range Test of the same software.The result of hematological parameters revealed that there was no malnourishment and anemic condition in the experimental birds.The serum biochemical parameters obtained fall within the normal range of birds, indicating good nutritional and physiological quality of the test ingredients.

KEYWORDS: Haematology, serum Biochemistry, yam and sweet potato peel

INTRODUCTION

High cost of feeds and scarcity of essential raw materials have necessitated poultry farmers to look out for alternative sources which could help to identify feed ingredients of lower cost and sound biological values that can partly supplement the conventional protein and energy sources in broiler diets. Cost of feed from the total estimated price of production in poultry is about 75% in Nigeria (Atteh, 2002, George & Wariboko 2015).

The combination of yam peel meal and sweet potato is good because the Yam peel meal good protein source while the sweet potato peel meal is good .Although some researchers have been used singly to replace part of dietary maize, replacement (Eka, 1985; Ekenyen*et al*, 2006; Aladoku, *et al*, 2007 ; Akinmutimi and Onen, 2008) and some have used it as a combination (Etela and Ironkwe, 2008; Diarra*et al*, 2012)

There is paucity of information available on literature of the Hematological and Serum Biochemical Parametersof Broiler finisher Chickens fed yam and Sweet Potato Peel Meals as Replacement for Maize. This study investigates the effect of feeding yam-sweet potato peels combination on Hematological and Serum Biochemical Parametersof Broiler finisher Chickens

MATERIALSAND METHODS

Location and duration of the experiment

This study was conducted with one hundred and eighty (180) day-old Anak broiler at the Poultry Unit of Teaching and Research Farm of Archdeacon Brown Education Centre, Woji, Port Harcourt Rivers State and it lasted for 8 weeks.

Processing of Yam, Sweet Potato Peels and Experimental Diets

The yam and sweet potato peels were washed, sun dried and milled immediate after obtaining it from the school kitchen of Archdeacon Brown Education Centre in Woji, Port-Harcourt. Five experimental diets were formulated and designated as T_1(control) containing 0% yam and sweet potato peels (Maize – based), while diets T_2, T_3, T_4 and T_5 contained 2.5%, 5%, 7.5%, and 10% each of yam and sweet potato peel meals respectively (Table 1).

Experimental Birds and Management

They were brooded using kerosene stoves under metal hooves and electric bulbs as source of light in a deep –litter house. The house was a tropical one with dwarf walls. Both sides were open covered with wire gauze. All drugs and vaccines were given to the animal.

The one hundred and eighty (180) birds were randomly allotted to five (5) treatment diets in a completely randomized design and raised separately in different pens. There were 36 birds in each treatment with three replicate and 12 birds per replicate. Feed and water were provided *adlibitum*.

Data Collection

Blood Collection and Analysis

Blood samples were drawn from punctured wing vein to aspirate about 5ml of blood. About 2.5ml of the sample was collected in ethylene diamine tetra acetic acid (ETDA) for haematological analysis. The other 2.5ml was allowed to coagulate to produce serum for blood chemistry analysis. The blood samples were analyzed within 2 hours for packed cell volume, (PCV), haemoglobin, (Hb), red blood cell (RBC), white blood cell (WBC), Mean corpuscular haemoglobin concentration (MCHC), bilirubin, creatinine, SGOT and SGPT as described by Schalm (1965), while the coagulated blood was subjected to standard methods of serum separation and analysis while haematological indices were calculated.

Data Analysis

The data collected were subjected to analysis of variance (ANONA) using SAS (2010) Software. Differences between treatment means were separated using Duncan's New Multiple Range Test of the same software.

RESULTS AND DISCUSSION

Table 2 showed that the Hematological indices of broiler finishers fed yam and sweet potato peels. The result did not follow any definite pattern that may be attributed to the test ingredients. Among the

measured parameter which included PCV%, HB, RBC, WBC, MCH and MCHC% there were significant difference($p<0.05$) among all the treatments. However there was no significant difference between treatment T_1 and T_4 in terms of HB%. Also, no significant difference ($p>0.05$) between treatment T_1, T_4 and T_5. There is also, no significant difference between treatment 2 and 4 in terms of WBC.

Table 3 showed that the serum biochemical parameters of broilers fed yam and sweet potato peel meal diets. The result obtained revealed significant difference ($p<0.05$) among the treatments in all the parameters measured which included bilirubin, creatinine, SGOT and SPGT. However, it did not follow any definite pattern that may be attributed to the test ingredients. Also, there were no significant difference ($P>0.05$) between treatment 1 and 2 in terms of SGOT. Similarly, there was no significant difference between treatment 1 and 4 and treatment 2 and 5 in terms of SPGT. The values of the hematological parameters of broiler finishers fed yam and sweet potato peels showed significant differences ($p<0.05$). The result of the investigation revealed that there were no malnourishment and anemic condition in the experimental birds since the values obtained fall within the normal range of measured hematological parameters. In a recent study with 15% inclusion level of yam peel by Akinmutimi and Onen (2008) observed that, there were significant difference for albumin, alkaline phosphate and urea. Also in a recent study on the combination of sweet potato and yam peel diets to broiler finisher by Ilo*et a*l., (2010), the result also revealed that among the parameters, measured only the WBC showed significant ($p<0.05$) difference between the treatments with T_2 (10%>PM) having the least value of (19.00) than others; the highest value of (27.36) was obtained from T_1(control).

The serum biochemicals in broilers fed yam and sweet potato peel meal diets showed significant differences ($p<0.05$).Among the treatments the value obtained from SGOT and SGPT fall within the normal range value of chicken as reported by Baerjee (1998). This indicated no toxicity in the experimental feed (Ologhobo, 1992). Increase creatinine value in blood among other things signifies poor protein utilization by the animals Fasina *et al*.,l999).

Conclusion and Application

The result of hematological parameters revealed that there was no malnourishment and anemic condition in the experimental birds.

The serum biochemical parameters obtained fall within the normal range of birds, indicating good nutritional and physiological quality of the test ingredients.

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Table 1: Composition of the Experimental Diets

Ingredients	**T_1 (control)**	**T_2**	**T_3**	**T_4**	**T_5**
Maize	55	50	45	40	35
Yam peel	-	2.5	5	7.5	10
Sweet potato peel	-	2.5	5	7.5	10
GNC	25.6	25.6	25.6	25.6	25.6
P.K.C	6	6	6	6	6
Wheat offal	4	4	4	4	4
Fish meal	4	4	4	4	4
Oyster shell	2	2	2	2	2
Bone meal	2	2	2	2	2
Salt	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Methionine	0.50	0.50	0.50	0.50	0.50
Lysine	0.40	0.40	0.40	0.40	0.40
Total	100	100	100	100	100
Calculated Chemical Composition					
Crude protein (%)	21.67	21.43	21.27	21.67	21.77
Crude fiber	3.9	4.25	4.5	4.75	5.05
ME(Kcal/kg)	2,983	2,902	2,879	2,864	2,756
Fat(%)	5.47	5.05	4.95	4.53	4.05
Calcium (%)	1.57	1.57	1.56	1.57	1.57
Phosphorus(%)	0.82	0.78	0.78	0.78	0.78

Table 2: Hematological Parameters of Broiler finisher Chickens fed yam and Sweet Potato Peel Meals as Replacement for Maize

Parameters	T_1	T_2	T_3	T_4	T_5	SEM
PCV (%	25.63^{d}	28.33^{b}	29.26^{a}	27.40^{c}	25.60^{d}	0.40
Hb (%)	8.91^{b}	9.55^{a}	9.65^{a}	8.83^{b}	7.91^{c}	0.20
RBC (10^6u/l)	2.32^{c}	2.69^{b}	2.92^{a}	2.40^{c}	2.38^{c}	0.06
WBC (10^3u/l)	29.42^{a}	26.62^{b}	24.62^{c}	20.65^{d}	27.42^{b}	0.80
MCV (fl)	11.05	10.53	10.02	11.41	10.76	1.39
MCH (mg)	36.36^{a}	33.40^{c}	34.11^{b}	33.33^{c}	33.30^{c}	0.30
MCHC(ml)	24.40^{e}	32.00^{a}	30.20^{b}	29.16^{c}	25.60^{d}	0.80

Means within the same rows having the same superscript a, b, c, d, e are not significantly different (p> 0.05).

Table 3: Serum Biochemical Parameters of Broiler finisher Chickens fed yam and Sweet Potato Peel Meals as Replacement for Maize

Parameters	T_1	T_2	T_3	T_4	T_5	SEM
Bilirubin (mol)	0.25^{c}	0.30^{b}	0.40^{a}	0.39^{a}	0.30^{b}	0.02
Creatinine (mg/L)	1.30^{c}	1.25^{e}	1.28^{d}	1.35^{b}	1.41^{a}	0.02
SGOT (Iu/L)	90.50^{d}	89.08^{d}	92.77^{c}	97.30^{b}	99.50^{a}	1.60
SPGT(Iu/	18.41^{b}	17.33^{c}	23.45^{a}	18.36^{b}	17.80^{c}	0.60

Means within the same rows having the same superscript a, b, c, d, e are not significantly different (p> 0.05).