CARCASS AND HAEMATOLOGY PARAMETERS OF BROILER CHICKEN REARED ON SUN CURED SESAME SUPPLEMENTED SESAME DIET.

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ABSTRACT

The study was conducted to assess the effects of inclusion of sun-cured sesame meal as supplement for soya bean meal on performanceand haematological characteristics of broiler chicken. Sesame is one of the agricultural product that is readily available cheap and can be used to reduce cost of livestock feed. A total of 150day old broiler chicks of relatively the same weight was randomly allotted to five dietary treatmentreplicated three times with ten chicks per replicate. The experimental design was completely randomized design (CRD). Five diets were formulated to contain different levels of sun-cured sesame meal at 0%, 10%, 20%, 30% and 40%. At the end of eight week two birds per replicate was slaughtered for carcass characteristics.Treatment effects on carcass characteristics (live weight, bled weight, eviscerated weight, dressing weight, drumstick, and breast) were not significant. However, variations in organs (liver and gizzard) were significant with birds on T2 (20%) having the highest liver weight of 63 compared to 42 observed for birds reared on T1 (0%). The gizzard increased significantly for birds on treatment 4 (30%) compared to 50 for those on T1 (0%) blood was collected from two birds per replicate and analysed for haematological indices. The supplementation of broilers diet effected a significant ($p<0.05$) variations in the haematological parameters. Birds reared on T4 (40% supplementation) had the least significant value of 19.0% in the PVC concentration compared to its counterpart on T1 (0%) with mean value of 32.0%. The RBC value varied from 4.04mm^{3}x 10^6 for birds on T1 to 3.36mm^3 x 10^6 recorded for birds on T4. Apparent variations in the values 2.17 – 3.17observed with eosinophil and haemoglobins 6.02 – 7.68g/dl were not significant. In conclusion, sun-cured sesame meal could be added to broiler chicken ration at 40% without any adverse effect.

Keywords: Sun-cured sesame meal, Soyameal, performance and haematological.

INTRODUCTION

Poultry production in Nigeria is estimated to be above 140 million birds which comparatively make Nigeria to be well developed in poultry industry among West African nations. It is perhaps one of the most significant sources of dietary quality protein and income to farmers as compared with other livestock production activities (Damoder *et al.*, 2008). Consumption of poultry meat is also increasing faster than that of other livestock with feed constituting about 70- 80% of the entire expenses in poultry production. (Adegbola, 1998).

Nigerians consume about 3.24g of animal protein per person per day which is far lower than the recommended value of 34g (FAO, 1990). Most Nigeria manufacturer and farmers use soymeal orgroundnut cake as part of dietary protein in animal diets which make the future of poultry production insecure as availability could not meet demand.

The survival of poultry industry depends on finding a comprehensive solution to substitute protein in feedstuff of livestock. Sesame seed has one of the highest oil content with over 50% oil content in some variety compared to soybean 20%. Sesame oil is one of the most stable vegetable oils, with long shelf life because of high level of natural antioxidants (*sesamin, sesamolin,*). Sesame seed oil is rich in omega 6 fatty acids, but lacks omega 3 fatty acids, with 25% protein.

The addition of sesame to high lysine meal of soybean produces a well-balanced animal feed.

This research is geared towards evaluating alternative protein feed ingredients for poultry (Atteh and Ologbenla *et al.*, 2003).Such alternative should have comparative nutritive

value but cheaper than the convectional protein sources. Hence the need

MATERIALS AND METHODS

Study site: This experiment was carried out at the poultry unit of Babcock University farm, Ilishan-Remo, Ogun State. Ilishan-Remo is in the rain forest zone of Nigeria with an annual rainfall of 1500mm. Ilishan is in the south west geo-political zone of Nigeria and falls on latitude of 6°54'N from the equator and longitude 3°42'E from the Greenwich Meridian and the mean annual temperature is about 27^{0}C.

Collection of Raw Materials: Sesame seed (*SesamumindicumL.)* was purchased from Bodija Market in Ibadan Oyo state Nigeria. It was winnowed, ground and sun-cured.

Experimental Animal and Management: One hundred and fifty day old broiler chicks were obtained from a commercial hatchery at Ibadan Oyo state. On arrival the chicks were placed in brooder house. Initial body weight of each chick was taken. The study lasted for 8 weeks. The birds were randomly allotted to five treatments in groups of thirty chicks with three replicates of ten chicks. Each group received fresh clean drinking water *ad-libitum* daily for a period of 8weeks.

Experimental Diet: Five diets were formulated such that protein and energy conformed to NRC (1994) recommendation as 0%, 10%, 20%, 30% and 40% of soyabean meal replaced with sesame meal weight/weight.

Data Collection: Data were collected on performance characteristics (feed intake, changes in body weight, feed conversion ratio and survivability).

Feed Intake: Feed allotted to each replicate was weighed at 008h any left-over was weighed at 008h to obtain voluntary intake.

Feed Intake = Feed Offered – Left Over

Average feed intake/ bird = **Feed offered (g) – feed leftover (g)** / **Total number of birds in the group**

Changes in Body Weight: The gain in the body weight of experimental bird was recorded on weekly basis by subtracting the values of initial body weight in grams from final body weight.

Weight Gain = Final Weight – Initial Weight

Average weight gain/bird = **Final(g) – Initial Weight (g)**

Total Number of Birds in the Group

Feed Conversion Ratio: This was obtained by dividing the quantity of feed consumed by the weight gained. All the values obtained for the feed intake and live weight gain were applied by using:

FCR = **Total Feed Consume (g)** / **Weight gain (g)**

Survivability: Survivability is the total number of broiler chicken that survived during the experiment. It was expressed in percentage. (%)

Survivability(%) = **Number of Survived Birds** / **Total Number of Birds** x 100

Blood parameters: Blood samples were collected from six randomly selected broiler chicken (2 broiler chicken per pen) at the end of day 56week of study. A blood collection was done through branchial vein puncture using disposable syringes with 20 x100mm metallic needles. Blood was collected into bottle containing Ethylene Diamine Tetra-acetate (EDTA).

Statistical Analysis: The data collected were subjected to analysis of variance (ANOVA) using SAS statistical software and differences between means, when significant, were compared, using (Duncan, 1955) at significance level of 5%.

RESULTS AND DISCUSSION

Carcass Characteristics of Broiler chickens

Carcass characteristics of broilers raised sun-cured sesame based are shown in Table 3. Birds reared on 10% sesame supplemented diet had the highest mean final live weight (2100) followed by those on the control diet (2000).Variations in live weight, bled weight, eviscerated weight and dressed weight were not significant (P>0.05). This suggested that the birds on the sesame performed similarly well with those of soya bean. In a similar trend treatment effect on the breast, thigh and drumstick were not significant (P>0.05). Bell *et al* (1990) reported that sesame could be used to supplement soybean meal in broiler diet at substitution level of 150g/kg in poultry diet but for optimal growth and feed conversion it must be supplemented with high lysine ingredient like fish meal. In another study growth of broiler chicks fed the diet containing 150g/kg sesame was not different from the control diet (Ravindran and Blair, 1992, Mamputu and Buhr, 1995). Apparent variations in the liver and the gizzard of birds on sun-cured

sesame meal diet were significant ($P < 0.05$) compared with the control diet. At 30% supplementation, highest value of gizzard was obtained and lowest was observed for the control diet. At 20% supplementation highest value for liver was obtained and lowest was obtained for birds on control diet. This could be attributed to high fibre in the feed stuff which resulted in an increased grinding activity of the gizzard. It could also be as result of the antinutrional factor in the diet (Forbes and Coras, 1995; Abdul-rahman *et al* 2009).

Haematological Characteristics

The result of haematological characteristics of broilers raised on sun-cured sesame meal supplemented diet, are shown in Table 5. White blood cell count (WBC), haemoglobin (HB) and Pack cell volume (PCV) are components that are sensitive to nutritional challenges and disease on performance of the birds. White blood cell count in this study ranged from 15.66-17.50mm^3 x 10^3 and haemoglobin 6.02- 7.68g/dl. Apparent variations were not significant. The values however fell within the ranged for healthy birds. Afolabi *et al* (2011) reported a range of 9.20–31.0mm^3 x 10^3 for white blood cell. Treatment effects on PCV value were significant ($P<0.05$).Values ranged from 19.00-32.00 and the normal range value ranged from 22-35% Mitruka and Rawnsley, (1977) reported a higher range of (31-33.5%) for broiler finisher. Lower value was recorded for diet T5 (40%). This might be as a result of lower protein in the feed.The value recorded for lymphocyte in this study disagreed with the findings of Adeyemo and Longe (2007) who reported a lower value of (35- 54%) for birds fed cotton seed cake between week 0 and 8 of age. The higher value recorded in this study suggested the resistance of the birds to disease.

Red blood cell (RBC) differs significantly in this study ($P<0.05$) with birds on T4 (30%) having the highest value. The value obtained in this study ranged from (3.36-4.57mm^{3}x10^6). Kuka and Kannkuka (2012) reported a range of (2-4xmm^{3}x10^6). The higher value which was observed in this study showed that the birds are not anaemic. Treatment effects on Basophils and eosinophil's were not significant ($P>0.05$) but fell within the required range for finisher birds.

It can be concluded that birds could accept sun-cured sesame meal supplemented with soyabean meal up to 40% of replacement without any detrimental effect on the health of the animals.

CONCLUSION AND RECOMMENDATIONS

Composition of sun- cured sesame meal showed its nutritional quality for broilers and its value for protein revealed its potential as an alternative protein source for soybean meal in poultry diet. It can be concluded that Sun- cured sesame seed can be included in broiler chicken ration up to 40% inclusion without any adverse effect on performance, carcass, haematology and meat quality of birds.

More research should also be done on various alternatives that could help farmers to increase their production.

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Table 1: Composition of broiler starter diet containing varying level of sun–cured sesame meal

Ingredient	Diet 1 (0%)	Diet 2 (10%)	Diet 3 (20%)	Diet 4(30%)	Diet 5(40%)
Maize	54.00	54.00	54.00	54.00	54.00
Soyameal	37.00	33.30	29.60	25.90	22.20
Sesame meal	-	3.70	7.40	11.10	14.80
Limestone	0.50	0.50	0.50	0.50	0.50
Bone meal	3.30	3.30	3.30	3.30	3.30
Fish meal	2.00	2.00	2.00	2.00	2.00
Wheat offal	2.60	2.60	2.60	2.60	2.60
Methionine	0.05	0.05	0.05	0.05	0.05
Common Salt	0.30	0.30	0.30	0.30	0.30
Premix	0.25	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00	100.00
Calculated analysis					
Crude protein (%)	23.02	22.40	21.65	21.00	20.30
ME(kcal/kg)	2959	2944	2930	2915	2891
Crude fibre (%)	3.72	3.86	3.94	4.06	4.16
Ether extract (%)	3.76	5.33	6.90	8.47	10.03

Table 2: Composition of Finisher Diet Containing varying level of sun- cured Sesame meal

Ingredient	Diet 1(0%)	Diet2 (10%)	Diet 3(20%)	Diet 4(30%)	Diet 5 (40%)
Maize	57.50	57.50	57.50	57.50	57.50
Soyameal	35.00	31.50	28.00	24.50	21.00
Sesame	-	3.50	7.00	10.50	14.00
Limestone	0.50	0.50	0.50	0.50	0.50
Bone meal	3.40	3.40	3.40	3.40	3.40
Methionine	0.05	0.05	0.05	0.05	0.05
Common Salt	0.30	0.30	0.30	0.30	0.30
Premix	0.25	0.25	0.25	0.25	0.25
Wheat offal	3.00	3.00	3.00	3.00	3.00
Total	100.00	100.00	100.00	100.00	100.00
Calculated analysis					
Crude protein (%)	21.11	20.61	19.81	19.16	18.52
Crude fibre (%)	3.71	3.74	3.89	3.99	4.11
Ether extract (%)	4.70	6.30	7.59	8.97	10.39
Metabolisable energy (kcal/kg)	2976	2962	2948	2934	2920

Table 3: Carcass Characteristics of Broiler Chicken Fed Supplemented sun-cured Sesame meal Diets

Parameter	T_1 (0%)	T_2 (10%)	T_3 (20%)	T_4 (30%)	T_5 (40%)	SEM
Live weight (g)	2000.00	2100.00	1900.00	2000.00	1900.00	0.22
Bled weight(g)	1900.00	2000.00	1800.00	1900.00	1800.00	0.21
Defeathered weight (g)	1800.00	1900.00	1700.00	1800.00	1700.00	0.23
Eviscerated Weight (g)	1600.00	1700. 00	1400.00	1600.00	1500.00	0.23
Dressed weight %	88.75	88.20	87.90	87.50	86.70	0.21
Drumstick %	16.00	16.00	17.90	17.90	17.50	2.4
Breast %	32.30	30.00	30.00	29.00	29.00	3.90
Thigh %	30.00	27.00	30.00	29.00	28.00	3.41
Back %	18.60^{b}	15.18^{bc}	16.07^{c}	21.46^{a}	20.67^{ba}	3.03
Liver %	2.63^{b}	3.12^{ba}	4.50^{a}	3.75^{a}	4.00^{a}	1.30
Gizzard %	3.13^{c}	3.53^{bc}	4.88^{ba}	5.00^{a}	4.67^{ba}	0.75
Dressing (%)	81.00	79.40	75.00	74.20	78.00	1.80

a, b, c: means along the same row with any identical superscript are not significant ($p>0.05$). SEM = standard error of mean.

Table 4: Haematological Characteristics of Broiler Chicken Fed Supplemented Sun-Cured Sesame Meal.

Parameters	T_1 (0%)	T_2 (10%)	T_3 (20%)	T_4 (30%)	T_5 (40%)	SEM	STD
PCV (%)	21.50^{cb}	32.00^{a}	24.83^{b}	30.33^{a}	19.00^{c}	0.86	22-35
RBC(mm^3x10^6)	3.67^{ab}	4.04^{ab}	4.16^{ab}	4.57^{a}	3.36^{b}	0.59	2-4.0
WBC(mm^3 $x10^3$)	16.83	17.35	15.80	17.50	15.66	0.62	9.2-31
Lymphocytes (%)	61.67^{b}	69.67^{a}	68.33^{b}	67.17^{a}	59.33^{b}	0.43	47-81
Monocytes (%)	4.33^{a}	2.50^{b}	2.33^{b}	4.00^{ab}	5.33^{a}	2.45	3.3-9
Eosinophil's (%)	3.00	2.17	3.17	3.17	3.00	0.47	2.2-6
Basophils (%)	0.83	0.67	0.53	0.50	0.83	0.36	0.5-1
Heterocytes (%)	30.17^{a}	25.00^{b}	26.17^{b}	25.17^{b}	31.33^{a}	0.55	16-33
Haemoglobin (g/dl)	6.02	7.40	7.68	7.30	6.37	2.25	7-13

a, b, c: Means along the same row having any identical superscript are not significant ($p>0.05$) SEM =standard error of mean.