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Nutritional Evaluation of GroundnutPod Waste in Growing Broiler Diet

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Abstract

A 35-day trial using 108 day broiler birds was conducted to evaluate the effect of dietary inclusion of Groundnut pods into the diet of broiler birds on their performance characteristics . The birds were separated into 4 groups and further replicated 3 times in a completely randomized design and fed diets containing 0,5,10 and 15% levels of Groundnut pods as a replacement for maize in the control diet. The birds were adequately housed, while feed and water were supplied ad-libitum. Other standard management practices were adequately put in place. At the end of the trial, 4 bird were randomly sampled from each treatment and slaughtered to access carcass characteristics. The results showed that there was no significant differences (P>0.05) in fed consumption and average weight gain between the different dietary treatments. Except for the relative weight of thigh and back which showed significant (P<0.05) differences between treatments other carcass characteristics were not significantly (P>0.05) affected. The relative organ weight showed no significant (P>0.05) difference based on the different dietary treatment except for the weight of the heart and lungs which showed significant (P<0.05) differences.

Keywords; Nutritional, Evaluation, Groundnut Pods , Growing Broiler

Introduction

The high cost of feeding has been the most serious problems confronting commercial poultry production in Nigeria. Feed cost represent between 60-80% of total cost of production in Nigeria. (Tegnia and Beynen, (2004); Oruwari et al (1995); Larry (1993). It is therefore necessary to reduce the cost of feeds in order to produce cheaper products without affecting profit (Egbunike et al, 2009). Thus in order to reduce these rising prices in livestock feed and also due to scarcity of conventional proteins and energy concentrates, animal nutritionists have had to turn their attention to ways of utilizing farm wastes, farm by-products and browse plants which are alternative but cheaper and readily available protein and energy sources for compounding feeds (Adeyemi et al, 2000).

Groundnut is a major food and oil crop produced in West Africa. About 4.8million tones of groundnuts are produced each year a 40:60 ratio of shall to nut, thereby bringing about a wantom generation of about 1.92million tones of Groundnut pods every year (Singh et al, 2005). Groundnut pods (GNP) which is produced after the removal of seeds from groundnut resource that can be useful for poultry feeding after further processing and according to Siulapwa and Simukoko (2005), the crude protein and crude fibre, in GNP are 10.4, 31.2,% respectively. Ikhatua and Adu (1984) and Nagaray (1988) have successfully fed GNP to Red Sokoto goats and cattle respectively.

The main purpose of this experiment is to replace maize with Groundnut pods (GNP) at 0, 5, 10 15% levels and to investigate the effect of the Groundnut pod based diet on the growth and nutrient utilization.

Materials and Methods

The groundnut pods used for this experiment were collected from an oil milling company (JOF) in Owo Local Government Area of Ondo State. The pods were sun dried, sieved and mulled using a burr mill machine and incorporated into the feed.

A total of 150 day old Ubar broiler chicks obtained from Arian Specialist Hatchery in Ibadan were weighed and transferred to brooding pens in a standard poultry house. After an initial adjustment period of 21days on a commercial starter feed. The birds were then weighed to obtain initial weight for each replicate and grouped into four (4). There were 4 experimental diets as follows: a control diet based on maize as source of energy and 3 diets in which maize was replaced partially in each of the experimental diets at 5, 10, 15% levels.
These were randomly assigned to the 4 dietary treatments in a completely randomized design with each group consisting of three (3) replicate with nine birds per replicate. Food and water were given ad-libitum for 35 days. Feed consumption was measured daily while group weight changes were taken are an interval of 7 days throughout experimental period. Proper medication and vaccines were given according to NVRI vaccination

schedules. At the close of the feeding trial, four birds per replicate were randomly selected, weighed and slaughtered by cutting the vena cava. The head, crop and shank were removed and the carcass eviscerated for calculation of dressing percentage. The different parts: thigh, drumstick, neck, wing, breast-cut were weighed. In addition, organs including the pancreas, heart, liver, kidney, gizzard, spleen were excised and weighed. Data obtained were subjected to a one-way ANOVA (Steel & Torrie, 1980). Result were analyzed using SAS/STAT user's guide from SAS Institute Inc. (2008).

Result and Discussion

Table 2 shows the proximate composition of the experimental diets. The analyzed crude protein, ranged from 20.5 to 21.7%. While the metabolizable energy of the feed ranged from 2890.9 kcal/kg to 29288.4kcal/kg. The crude protein of the diets used in this study falls within the range reported by Oluyemi & Roberts (1979) for broiler chickens. The analyzed nutrient content of the diet were within the range recommended by NRC (1984).

The average feed consumed by the broiler birds fed groundnut pod based diets are represented in table 4. The average feed consumed by the birds in week 1 was significantly ($P<0.05$) affected by the treatment. The birds on diets 3 consumed the largest quantity of feed (893.17 $\pm$ 9.09) while the birds on diets 3 consumed the largest quantity of feed (893.17 $\pm$9.09) while the birds on diet 1 consumed the least (807.93 $\pm$121.68). however for weeks 2-5, there was no significant difference in feed consumed by the birds in all the dietary treatment. The feed consumption of the birds on the dietary treatments compares favourably with the findings of Esonu et al (2003) who fed broiler birds with *microdermin puberula* leaf meal.

The average weight gain (g) of broiler birds fed diets containing groundnut pods is represented in table 5. The result showed no significant ($P<0.05$) effect on weight gain of birds on the different dietary treatment throughout the 5 weeks. This study also revealed an increase in cumulative weight gain in birds fed the dietary treatment.

Carcass characteristics (g/kg) body weight) of broiler chicken fed groundnut pod based diet is shown in table 6. The table reveals significant ($P<0.05$) differences in dietary treatments over relative weight of thigh and back. There was no significant treatment effect ($P<0.05$) on percent dressing weight and on different parts for examples neck, chest, drumstick, shank, head and body fat. The results of this study also shows an improvement in carcass characteristics & organ weight of birds on the test diet agreeing with Barton (1998), who observed that dietary protein content has a marked effect on the quality of carcass of broiler chicken. The dressing percentage obtained in this study were higher than the 78% reported by Aduku & Olukosi (2000) for Nigerian dressed chicken ,thereby indicating that inclusion of groundnut pods in diets of broiler chicken promotes good carcass yield, this is of great benefit to the farmer.

Table 7 shows the data on relative organ weight (glkg. BW). It reveals that there was no significant ($P>0.05$) treatment effects on the lungs, spleen, liver, gizzard and pancreas weight. However, the weight of heart & kidney show significant ($P<0.05$) differences due to dietary effect.

Conclusion

The results of the this study revealed that broiler birds can tolerate up to 15% inclusion of groundnut pods in their without adverse effect on feed, intake, feed consumption, carcass characteristics, relative organ weight & on Hematology & serum biochemistry.

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Table 1: Proximate Composition Of Groundnut Pod Fed To Broiler Chicken

Nutrient	Diet			
	Control	5%	10%	15%
%Ash	4.17	5.25	6.86	8.50
%Moisture Content	11.15	11.32	10.33	15.75
% Crude Protein	20.47	20.86	20.7	20.78
% Fat	3.63	2.22	2.15	2.44
% Fibre	4.13	3.87	3.75	4.24
% CHO	56.45	56.50	56.23	48.30

TABLE 2: Gross Composition (%) G/Kg Of Experimental Diet Containing GNP

	Diets			
Ingredients	Control	5%	10%	15%
Maize	53.3	52.10	52.0	49.99
Groundnut Pod	0	2.65	5.3	7.95
Soya Beans Meal	37	36	33	32
Brewers Dried Grain	5	5	5	5
Bone Meal	2.5	2.5	2.5	2.5
Oyster Shell	0.5	0.5	0.5	0.5
Methionine	0.1	0.1	0.1	0.
Premix	0.5	0.5	0.5	0.5
Palm Oil	1	1	1	1
Salt	0.1	0.1	0.1	0.1
Total	100	100	100	100

TABLE 4: Average Feed Consumed Of Broiler Chicken Fed Groundnut Pod (G/Bird) Treatment

Parameter	Diet 1	Diet 2	Diet 3	Diet 4	SS
Week 1	807.93± 121.68[b]	837.03±13.65[b]	855.20±9.09[a]	855.20 ±15.24[ab]	*
Week 2	1127.77± 25.44	1101.67 ± 20.36	1195.00± 45.56	1168.60 ±8.04	NS
Week 3	1321.27±1.87	1379.63±21.90	1404.17±53.91	1355.53 ±25.76	NS
Week 4	1300.00 ±9.64	1427.77 ±75.42	1446.30 ±70.36	1471.30 ±41.03	NS
Week 5	1316.63 ±60.09	1470.37±95.70	1425.93±49.72	1522.27±174.01	NS

* Significant (P<0.05)

TABLE 5: cumulative weight gain (g) of broiler chicken fed Groundnut pod

TREATMENTS

Parameter	Diet 1	Diet 2	Diet 3	Diet 4	SS
Week 1	120.27± 8.49	125.93±11.32	132.09±11.43	111.73 ±7.59	NS
Week 2	286.42± 17.05	286.42 ± 10.76	290.74± 13.40	260.49 ±15.02	NS
Week 3	44.74±14.60	427.16±30.27	426.54.±24.39	395.06 ±17.28	NS
Week 4	530.86±3.75	550.62 ±23.65	543.21 ±18.41	512.35 ± 20.21	NS
Week 5	618.52 ± 10.19	656.79±19.40	631.48±26.60	595.06±20.55	NS

* Significant (P<0.05)

TABLE 6: Carcass Characteristics Of Broiler Chicken Fed Groundnut Pod

Parameter	Diet 1	Diet 2	Diet 3	Diet 4	SS
Dressed weight %	93.44±1.31	93.41± 0.98	94.69± 1.25	93.99 ±0.90	*
Eviscerated weight %	86.49± 1.29	87.03 ±0.64	87.58 ±1.03	86.92 ±0.96	NS
Neck g/kg body weight	141.71±1492	136.94 ±8.12	138.33 ±15.93	156.07± 11.20	NS
Chest g/kg body weight	57083±26.15	584.17± 23.34	557.50 ±45.27	575.00± 33.54	NS
Thigh g/kg body weight	150.26 ±14.53[b]	167.63 ±8.16[a]	146.65 ±16.79[b]	139.67± 9.33[ab]	NS
Drumstick g/kg body weight	130.36 ±8.24	144.83 ±9.06	114.81± 5.04	132.33± 9.80	NS
Back g/kg body weight	374.±17 17.86[ab]	412.54 28.58[ab]	353.33 ±16.96[b]	411.67± 30.76a	NS
Shank g/kg body weight	49.47 ±3.95	67.43 ±12.27	51.82 ±4.16	52.38 ±4.84	NS
Head g/kg body weight	58.95 ±2.31	79.51± 14.59	62.55 ±4.05	64.80 ±5.26	NS
Belly fat g/kg body weight	29.22 ±8.20	35.11 ±6.71	27.68 ±5.90	40.53 ±2.27	NS

* Significant (P<0.05)

TABLE 7: RELATIVE ORGAN WEIGHTS (G/KG BODY WEIGHT) OF BROILER CHICKEN FED GROUNDNUT POD

Parameter	Diet 1	Diet 2	Diet 3	Diet 4	SS
Heart	10.55± 0.57[ab]	10.06± 0.84[b]	11.29± 0.60	12.03 + 0.38[a]	NS
Lungs	13.61± 1.07	15.60 ±0.51	12.72 ±0.50	14.62± 1.21	NS
Spleen	4.06 ±2.00	1.86 ±0.22	2.93 ±0.23	3.23 ±0.41	NS
Liver	43.13± 5.00	32. 41± 4.14	36.2 ±1.69	35.54 ±2.41	NS
Kidney	12.52± 0.84[b]	13.07 ±1.3[a]	1424 ±1.74[a]	14.90 ±1.8[ab]	NS
Gizzard	53.01± 4.67	51.75 ±2.66	51.22 ±4.64	49.43 ±3.92	NS
Pancreas	5.32 ±0.25	5.77 ±0.37	6.63 ±0.62	5.53 ±0.56	NS

* Significant (P<0.05)