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GROWTH PERFORMANCE OF BROILER CHICKENS FED GRADED LEVELS OF SUN-DRIED CASSAVA ROOT MEAL BASED DIETS AT FINISHER PHASE (6 - 8) WEEKS

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ABSTRACT

A three weeks experiment was conducted at the finisher phase (6 - 8) weeks using sun-dried cassava root meal (SDCRM) as source of energy to determine the growth performance, pooled performance, carcass and gut characteristics of broiler chicken fed diet containing the sun-dried cassava root meal (SDCRM) and the experiment lasting for three weeks. Five isonitrogenous diet was formulated for finisher phase, maize was partly replaced with sun-dried cassava root meal (SDCRM) at 0, 20, 30, 40, and 50% levels designated as diet, 1, 2, 3, 4, and 5 respectively. Routine measures were strictly observed and the following growth parameters were determined: daily feed intake, daily weight gain, feed conversion ratio, feed intake, and mortality. Also, carcass weight, live weight (kg), plucked weight (kg), eviscerated weight (kg), dressed (%) and liver weight (%). Data were analyzed using analysis of variance. The following performance indices: daily feed intake, feed conversion ratio, feed efficiency and mortality were not significantly ($P<0.05$) affected and same was observed for pooled performance, while most of the carcass and gut characteristics were significantly affected by the diet with few showing no significant difference. It is recommended that farmers should be encouraged to increase cassava production as an alternative source of energy in poultry diets when faced with adverse conditions.

Keywords: Cassava Meal, Sundried, Feed Intake, Carcass Weight

INTRODUCTION

In Nigeria, one of the problems confronted by the poultry industry is the cost of feeds. The existing practice of heavy dependence on feed ingredients will continue to pose a constraint to the development of the livestock and poultry products leading to deficiencies of animal protein intake of average Nigerians.

Nigeria still remains among the least consumers of animal protein in Africa, in spite of her enormous natural and human resources. An average of 6.8g of animal protein per person per day is consumed in Nigeria which represents only about 20% of 35g recommended by the FAO (Oyawoye, 2002). In order to meet the animal protein needs of the ever growing Nigerian population in the short term, effort should be directed towards animals which are prolific and have short generation intervals, such as poultry and rabbits. A broiler enterprise can produce meat within seven weeks and layers have the first egg produced within eighteen weeks of age (Anthony, 2001).

Competition between man and livestock for maize is increasing day by day, thus there is need to scout for alternative energy source that have similar calorie value and perhaps cheaper sources of energy for poultry at lower cost under low fertile soil and lower rainfall requirement. Cassava appears to be the best alternative source of energy for the livestock industry as it is one of the treasures of nature that adopts to poor soils on which many other crops fail. Cassava is high yielding and low cost source of calories. One of the major food deficiencies in most part of the world is protein (Awolola and Adegbija, 1999). The energy feedstuff mainly use in poultry feed in Nigeria is maize. It constitutes 40 – 50% of broiler ration (Ogundipe, 1987).

Therefore, to reduce competition between man and chickens and to reduce cost effect, cassava root is a good strategy since the crop required less or no fertilizer as a major cost of input when compared to maize production.

MATERIALS AND METHODS

The materials for the experiment were purchased from Muda Lawa Market in Bauchi, this include: sun-dried peeled cassava root, wheat offal, soyabean, bone meal, salt, fish meal, broiler premix, methionine, lysine, drugs and vitamins. The ingredients were grounded using a hammer mill, while feed formation and mixing was done at Abubakr Tafabelewa University Bauchi feed mill. . Sun dried cassava root replaced maize at 0, 20, 30, 40 and 50% levels designated as treatment 1, 2, 3, 4, and 5 respectively. A total of two hundred and forty three (240) broiler chickens (Arbor Acres) were obtained from "Tuns farms (Nig.) Limited, Osogbo, km9 Ikrun Road, Osogbo" through their Jos branch distributor. The chickens were randomly distributed to five treatments with 16 birds replicated three times in a randomized completely design.

The poultry houses used were partitioned into pens (2.8 x 1.28 m) by using wood and wire mesh and study on finisher phase conducted in 2019 lasted for three weeks. A vaccination procedure for broiler chickens was duly followed and pentacox was given to the birds against coccidiosis. Vitalyte and glucose D were administered as an anti-stress before and after each vaccination to enhance good performance. The experimental diet for the finisher phase 20% CP were Isonitrogenous. The composition of the experimental diet is presented in Table 1. All data were subjected to analysis of variance (ANOVA). The significant difference between treatments means were separated using Duncan's Multiple Range test of SPSS (2012).

RESULTS AND DISCUSSIONS

The performance of broilers chickens fed diets containing graded levels of SDCRM is presented in Table 2. The daily feed intake, feed conversion ratio, feed efficiency and mortality incurred during the feeding trial were not significant ($P>0.05$) as graded levels of sun dried cassava root meal based diets increases. This suggested that there is no credible evidence that inclusion of graded levels of sundried cassava root meal increased the aforementioned parameters. It could also means that there is really no effect on those parameters. Daily feed intake mean value for broiler chickens fed diet 2 was slightly above SDCRM based diets and the control diet though insignificant. Feed conversion ratio for all SDCRM based diets means values were also slightly above the mean value for those fed maize based diet as the control and feed efficiency for the control diet recorded slightly higher means values when compared to SDCRM based diets. This also demonstrated SDCRM based diets were not toxic to the birds. It also shows that SDCRM based diets could replaced maize at 50% if daily weight gain is not the focus.

Significant different was observed only for daily weight gain of chicken fed SDCRM diets. The control diet was significantly higher than SDCRM based diets which were statistically similar. This suggested that 20% inclusion above reduced weight gain.

The overall performance of broilers fed diets containing sun –dried cassava root meal is presented in Table 3. The overall performance had the same trend as performance parameters presented in Table 2. Insignificant means values daily feed intake, feed conversion ratio, feed efficiency and mortality for performance and pooled performance of broiler chickens fed SDCRM agrees with the findings of Enruvbetine *et al*. (1999); Agunbiade *et al*. (2004); Uchegbo *et al*. (2004) Agugu and Okeke (2005) that reported no effects on broiler chickens. But this study contradict the study of Tion and Adeka (2000) that reported significant increase in feed intake as the level of cassava meal was increased in the diets at the finisher phase.

The carcass yield, internal organ weights and gut characteristics of the birds fed sun-dried cassava root meal is presented in Table 4. Significant $P< 0.05$) differences were observed between all the parameters evaluated except dressed, head and legs, lungs, kidney, pancreas, small intestines, abdominal fat and caecal weight percentage.

The dressing percentage, heads and legs, lung, kidney, pancreas, small intestine, abdominal fat and caecal weight were not having any significance difference from each other. This is in support with the findings of Okoye (1996) who fed sorghum and maize diets to broiler chickens.
The live weight, plucked, eviscerated, carcass, and gizzard weight, spleen, heart, liver weight, large intestine and liver weight percentages differ ($P<0.05$) significantly between treatment means ($P<0.005$). These agree with the findings of Agunbiade *et al*. (2004) in broilers fed fermented and unfermented cassava tuber meals. Also Turner *et al*. (1976) reported similar findings in poultry fed sweet potato and protein supplement.

CONCLUSION AND RECOMMENDATION

Sun dried cassava root meal (SDCRM) can be included at 30% level in the diets of broiler chickens with no adverse effects on carcass yield and gut characteristics. Further study should be conducted to assess the addition of fat to improve texture and reduce dustiness associated with cassava based diet. Farmers should be encouraged to increase cassava production as an alternative source of energy in poultry diets when faced with adverse conditions.

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Table 1: Ingredients and nutrients composition (%) of sun-Dried cassava root meal at the finisher phase (6-8 weeks)

	Diets				
Ingredients	**1 (0%)**	**2 (20%)**	**3 (30%)**	**4 (40%)**	**5 (50%)**
Maize	51.12	41.12	35.98	30.84	25.7
Sun-dried cassava	0.00	10.28	15.42	20.56	25.70
Full fat soya beans	27.9	27.90	27.90	27.90	27.90
Fish meal	2.00	3.00	4.50	6.50	8.00
Wheat offal	15.00	14.00	12.50	10.50	9.00
Bone meal	3.00	3.00	3.00	3.00	3.00
Premix	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25
Methionine	0.10	0.10	0.10	0.10	0.10
Lysine	0.10	0.10	0.10	0.10	0.10
Total	**100**	**100**	**100**	**100**	**100**
Calculated Analysis					
CP (%)	19.55	19.51	19.98	20.68	21.15
ME (Kcal/kg)	2936.95	2928.70	2940.17	2959.45	2970.92
CF (%)	4.14	4.83	5.10	5.33	5.61
EE (%)	7.70	7.34	7.18	7.01	6.86
Ash (%)	3.79	5.50	5.31	4.43	4.57
Ca (%)	1.33	1.41	1.51	1.64	1.74
P (%)	0.78	0.89	0.83	0.89	0.92

Biomix vitamins and trace minerals premix containing the following per 2.5kg; vitaminA8,500.00iu D_3 1500,000,00iu vitamin E 10,000,Vitamin K_3 1,500.00 mg, Vitamin B_1 1,600.00 mg, Vitamin B_2 4,000.00 mg,Niacin 20,000.00 mg, Pantrothenic Acid 5,000.00 mg, Vitamin B_6 1,500.00 mVitaminB_{12}10.00mg,FolicAcid500.00mg,Biotin H_2 750.00 mg, Choline Chloride 176,000.00 mg, Cobalt 200.00 mg, Copper 3,000.00 mg, Iodine1,000.00 mg, Iron 20,000.00 mg, Manganese 40,000.00 mg, Selenium 200.00 mg,Zinc 30,000.00 mg, Antioxidant 1,250.00 mg

Table 2: The performance of broiler chickens fed graded levels of sun-dried cassava root meal based diets at the finisher phase (6-8 weeks)

	Diets					
Parameters	**1 (0%)**	**2 (20%)**	**3 (30%)**	**4 (40%)**	**5 (50%)**	**SEM**
DFI (g)	129.5	133.49	121.85	121.67	118.12	2.61^{NS}
DWG (g)	41.82^{a}	29.06^{b}	29.20^{b}	29.97^{b}	31.04^{b}	1.35^{*}
FCR	3.29	4.79	5.06	4.24	4.07	0.20^{NS}
FE	0.32	0.22	0.25	0.24	0.27	0.01^{NS}
Mortality	1.40	1.20	1.20	1.60	1.40	0.15^{NS}

^{ab} =Means bearing different superscript within same row different significantly ($*$ = P<0.05)
DFI= Daily feed intake
DWG = Daily weight gain
FCR = Feed conversion ratio
FE = Feed efficiency
SEM = Standard error of means
= No significant difference

Table 3: Pooled performance of broiler chickens fed graded levels of sun-dried cassava root meal based diets (2-8 weeks)

	Diet					
Parameters	**1 (0%)**	**2 (20%)**	**3 (30%)**	**4 (40%)**	**5 (50%)**	**SEM**
DFI (g)	103.63	105.35	95.36	95.45	92.95	1.90^{NS}
DWG (g)	43.31^{a}	34.62^{b}	34.77^{b}	33.73^{b}	34.62^{b}	0.78^{**}
FCR	2.40	3.06	2.78	2.84	2.72	0.07^{NS}
FE	0.42	0.33	0.37	0.35	0.37	0.01^{NS}
Mortality	1.40	1.20	1.20	1.60	1.40	0.15^{NS}

^{ab} = means bearing different superscript within the same row different significantly
($**$ = P<0.01; *=P< 0.05)
DFI = daily feed intake
DWG = daily weight gain
FCR = feed conversion ratio
FE = feed efficiency
SEM = standard error of means
= no significant difference

Table 4: Carcass yield and gut characteristics (% body weight) of broiler chickens fed graded levels of sun-dried cassava root meal based diets

	Diets					
	1	2	3	4	5	
Parameters	0%	20%	30%	40%	50%	SEM
Live weight (kg)	2.48^{a}	2.17^{abc}	2.20^{ab}	1.81^{c}	1.95^{bc}	0.05**
Plucked weight(kg)	2.11^{a}	1.90^{ab}	2.01^{a}	1.64^{c}	1.77^{ab}	0.05**
Eviscerated weight (kg)	1.90^{a}	1.66^{ab}	1.76^{ab}	1.36^{c}	1.50^{bc}	0.13**
Carcass weight(kg)	1.76^{a}	1.53^{ab}	1.57^{ab}	1.26	1.35^{bc}	0.04**
Dressed (%)	70.93	70.60	71.41	69.23	69.61	0.58^{NS}
Head and leg (%)	5.33	5.45	5.85	6.34	6.09	0.12^{NS}
Lung (%)	0.43	0.48	0.43	0.55	0.45	0.02^{NS}
Kidney (%)	0.19	0.29	0.23	0.29	0.28	0.01^{NS}
Spleen (%)	0.10^{ab}	0.11^{ab}	0.08^{bc}	0.16^{a}	0.07^{c}	0.01***
Heart (%)	0.32^{ab}	0.40^{a}	0.30^{b}	0.46^{ab}	0.41^{ab}	0.01***
Gizzard (%)	1.76^{a}	1.66^{b}	1.75^{ab}	2.10^{ab}	1.71^{b}	0.04**
Pancreas (%)	0.28	0.28	0.23	0.32	0.26	0.01^{NS}
Small intestine (%)	4.18	4.20	4.22	4.09	4.31	0.12^{NS}
Large intestine (%)	0.21^{a}	0.25^{a}	0.15^{b}	0.23^{ab}	0.14^{b}	0.01*
Abdominal fat (%)	2.11	2.54	2.38	2.12	2.55	0.10^{NS}
Caecal weight (%)	0.58	0.65	0.52	0.69	0.63	0.03^{NS}
Liver weight (%)	1.86^{a}	2.19^{a}	2.12^{a}	2.28^{ab}	1.82^{b}	0.04***

^{abc} - means denoted by different alphabets in the same row are significantly different
*** – P<0.001 level
** – p<0.01 level
* – p<0.05 level
NS—no significant difference
SEM- standard error of means