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INFLUENCE OF ROASTED FLUTED PUMPKIN POD HUSK WASTE ON GROWTH AND CARCASS YIELD OF BROILER CHICKENS IN HUMID TROPICAL ENVIRONMENT.

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ABSTRACT

In an 8-week feeding trial, four broiler starter and finisher diets that contained 0, 10, 20 and 30% roasted fluted pumpkin pod husk waste meal were randomly assigned to a total of 144 broilers in a completely randomized design to assess their performance and carcass traits. The results showed that only the average liveweight and daily weight gain were significantly (P<0.05) highest in broilers fed 20% fluted pumpkin pod husk waste than those on other dietary treatments. Similarly, the carcass traits revealed that only the average liveweight, plucked and eviscerated weights, gizzard and lungs relative weights were significantly (P<0.05) affected by the dietary treatments. It therefore infers that 20% level of inclusion of roasted pumpkin pod husk waste meal is adequate in broiler diets for enhanced growth performance and carcass yield.

Key words : Broilers, Carcass yield, Cost benefit, Growth, Pumpkin pod husk.

INTRODUCTION

The problem of inadequate feed ingredients for poultry has remained with poultry farmers in developing countries including Nigeria. This could be blamed on the rising need of man for the same feed ingredients for food and industrial raw materials as well as the exorbitant cost of conventional feed ingredients. Against this background, the need for intensive investigation on the utilization of agro-industrial by-products such as yam and cassava peels, brewers' dry grain, kola nut husk, cocoa pod husk amongst others to keep poultry sub sector vibrant becomes imperative. Fluted pumpkin pod husk (FPPH) waste is a crop residue generated after harvesting the seeds from the pods which are discarded and dumped at local market places, where they constitute environmental hazards and nuisance. Denton and Olufolaji, (2000) reported that fluted pumpkin (Telfairia occidentalis, Hooker fil) an important vegetable crop in the family cucurbitaceae and it is widely cultivated and consumed in south eastern Nigeria (Asiegbu, 1992). It is a crop of commercial importance cultivated across the lowland tropics in West Africa with Nigeria, Ghana and Sierra Leone being major producers. The crop is mainly grown for its leaves which constitute an important component of the diet in many West African countries (Akoroda et al; 1995). Nworgu et al (2006) asserted that leaf extract from pumpkin is rich in crude protein (21.31%), calcium (0.67%) and iron (18.50mg/100g), while the leaf stalk contains 20% crude protein, 0.96% calcium and 0.32% potassium. The protein from the leaves may be recovered and fed as solution in form of protein

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concentrates (Farinu, *et al* 1992). In Nigeria, leaf extract from pumpkin is regarded as blood tonic for the rich and the poor (Nworgu et al 2007). Adedapo *et al* (2002) used fluted pumpkin and sorghum bicolour extracts as potent haemostatic agent in domestic rabbits and concluded that rabbits placed these extracts had highest values of packed cell volume, haemoglobin, red blood cells, white blood cells and responded faster to therapy. Previous studies on the utilization of industrial by-products from kola nut, mango, cocoa, plantain, cashew nut and pineapple for feeding livestock particularly poultry abound (Sobamiwa, 1994; Oke *et al* 2004; Lamidi *et al* 2008) but there is a dearth of information on the suitability of using fluted pumpkin pod husk waste as poultry feedstuff. Against this backdrop, the present investigation was to assess the influence of dietary levels of fluted pumpkin pod husk waste meal on the growth and carcass yield of broiler chickens.

MATERIALS AND METHODS

The study was carried out in the Poultry Unit of the Teaching and Research Farm of Ambrose Alli University, Ekpoma, Edo State of Nigeria. Fluted pumpkin pod husk waste used for the study was collected from the dumping sites of Ekpoma and Iruekpen markets respectively of Esan West Local Government Area of Edo State, Nigeria. The fluted pumpkin pod husks were washed thoroughly, sun dried and later roasted for 15minutes. Roasting was done at 120°C using a wide aluminum pan containing sand to avoid burning the husks on naked flame from dried wood. Other feed ingredients were sourced from Benin City and Ekpoma.

Proximate analysis

The proximate analysis of the roasted fluted pumpkin pod husk was carried out according to AOAC (2000) to determine the percentage crude protein, crude fibre, ether extract, ash and nitrogen free extract as reflected in Table 1.

Diets

Formulated were four broiler starter and finisher diets with inclusion of fluted pumpkin pod husk (FPPH) wastes meal in place of maize at concentrations of 0, 10, 20, and 30% respectively. Formulations of the diets were to be isonitrognous (23% and 21% crude protein) and isocaloric (2800 and 3000 Kcal/kg) as reflected in Table 2.

Design and management of birds

A total of one hundred and twenty day-old Anak 2000 broiler chicks were used for the study. Twenty four chicks each with mean initial weight range of 44 - 45g were selected and assigned to each of the four treatment diets (1,2,3 and 4) in a complete randomized design (CRD). Each treatment group was in triplicates of eight chicks each and all the chicks had access to the experimental diets and clean water *ad libitum*. All chicks were brooded for four weeks in deep liter compartment. Routine medication, vaccination and other management practices were carried out.

Performance study

During the feeding trial, weekly feed consumption and weight changes were recorded, where weight gained, feed to gain ratio and protein efficiency ratio were estimated to measure the performance of birds.

Carcass quality study

At the end of the eight week feeding trial, the birds were starved overnight and two birds each were randomly selected from each replicate weighed, plucked, slaughtered and eviscerated. Dressed, carcass weights and relative cut-up parts and organ weights were recorded.

Statistical Analysis

Results from the study were subjected to a one-way analysis of variance (ANOVA) and significant treatment means were compared using the Duncan's multiple range test as outlined by Steel and Torrie, (1990) with the aid of SAS (1999) package.

RESULTS AND DISCUSSION

The roasted fluted pumpkin pod husk (FPPH) waste used for the feeding trial contained 10.25% crude protein, 25.63% crude fibre, 1.73%

ether extract, 4.11% ash and 45.36% nitrogen free extract (Table 1). This shows that FPPH is a good source dietary fibre, low in crude protein and fat, but could be used as energy diluents when formulating a low fat ration for poultry (Lamidi et al 2008).

Data on growth response (Tables 3 and 4) revealed that only the average liveweight and daily weight gain of broilers were increased ($P<0.05$) progressively as the level of inclusion of FPPH increases in the diet at both starter and finisher phases respectively. This suggests that higher inclusion of FPPH waste did not enhance ($P>0.05$) other performance indices considered. Although, average daily feed intake of birds were not affected ($P>0.05$) by the inclusion levels of FPPH waste,

Table 1 : Proximate composition of roasted fluted pumpkin pod husk (%dry matter).

Component	%
Dry matter	93.50
Crude protein	10.25
Crude fibre	25.63
Ether extract	1.73
Ash	4.11
Nitrogen free extract	45.86

Table 2: Gross composition of experimental starter and finisher diets.

	Inclusion levels of FPPH (%)				Inclusion levels of FPPH (%)			
	0	10	20	30	0	10	20	30
	Starter diets				Finisher diets			
Ingredients	1	2	3	4	1	2	3	4
Maize	55.00	49.50	44.00	30.50	50.00	45.00	40.00	35.00
FPPH	0.00	5.50	11.00	16.50	00.00	5.00	10.00	15.00
Soyabean meal	30.00	30.00	30.00	30.00	34.80	34.80	30.00	30.00
Fish meal	1.50	1.50	1.50	1.50	2.00	2.00	2.00	2.00
Wheat offal	5.30	5.30	5.30	5.30	5.00	5.00	5.00	5.00
Palm kernel cake	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Bone meal	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Oyster shell	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Premix (Min. & Vit)	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
DL-methionine	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
DL-lysine	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Salt	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Calculated analyses								
Crude protein	23.21	23.28	23.31	23.38	21.27	21.30	21.33	21.40
M.E (kcal/kg)	2849	2845	2850	2855	2998	3000	3002	3003
Determined analyses								
Dry matter	85.78	85.48	85.34	86.01	85.95	85.90	86.01	86.05
Crude protein	22.80	23.20	22.83	22.91	21.01	20.98	20.88	20.80
Crude fibre	3.59	3.87	3.32	3.78	4.50	4.35	4.32	4.43
Ether extract	2.93	2.71	2.78	2.73	2.54	2.55	2.45	2.54
Ash	5.36	5.43	6.14	6.39	4.35	4.43	5.10	5.14
Nitrogen free extract	51.10	50.27	50.27	50.20	53.55	53.59	53.26	53.14

Table 3 : Performance indices of broiler starters as influenced by the dietary treatments.

	Inclusion levels of FPPH(%)				
	0	10	20	30	
	Diets				
Parameters	1	2	3	4	SEM±
Initial weight (g/bird)	45.00	44.90	45.00	44.85	-
Average liveweight (g/bird)	733.00 ^{b}	788.30 ^{ab}	816.67 ^{a}	716.67^{c}	24.06
Average daily weight gain (g/bird)	27.10 ^{c}	27.95 ^{a}	28.41 ^{a}	27.25^{c}	0.23
Average daily feed intake (g/bird)	33.98	34.24	32.73	32.41	0.74
Feed : Gain ratio	1.25	1.23	1.15	1.19	0.49
Protein efficiency ratio (%)	1.17	1.21	1.23	1.18	0.31
Mortality (%)	0.00	0.00	0.00	0.00	-

abc: Means in the same row with varying superscripts differ significantly (P<0.05).

Table 4 : Performance indices of broiler finishers as influenced by the dietary treatments.

	Inclusion levels of FPPH (%)				
	0	10	20	30	
	Diets				
Parameters	1	2	3	4	SEM±
Average liveweight (kg/bird)	1.93 ^{b}	1.98 ^{ab}	2.02 ^{a}	1.92^{c}	0.76
Average daily weight gain (g/bird)	33.73 ^{c}	37.15 ^{a}	42.33 ^{a}	36.08^{c}	0.18
Average daily feed intake (g/bird)	100.95	101.80	117.23	99.15	0.61
Feed : Gain ratio	2.86	2.74	2.76	2.74	0.99
Protein efficiency ratio (%)	1.77	1.77	2.01	1.72	0.15
Mortality (%)	0.00	0.00	0.00	0.00	-

abc: Means in the same row with varying superscripts differ significantly (P<0.05).

but the improvement in the feed intake irrespective of the test diet suggests that higher levels of FPPH did not affect palatability of the test diets (El-Boushy and Vander Poel, 1994). It could also be ascribed to the progressive dilution of energy concentration of the diets with increasing levels of FPPH waste, a view already suggested by Uchegbu *et al.* (2004). The insignificant improvement in protein utilization could be due to the quality and availability of nutrients in fluted pumpkin pod husk waste which complemented that of maize. This lends support from the reports of Ayanwale and Aya, (2006) and Lamidi *et al* (2008).

Variability among broilers fed the dietary treatments for liveweight, plucked and eviscerated weights, gizzard and lungs relative weights (Table 5) were significant (P<0.05). Dressed weight of broilers were not affected (P>0.05) by the treatment diets, but the values obtained fell within the range of 84 to 88% reported by Isikwenu *et al* (2010) for broilers. Only the abdominal fat deposition amongst the relative weights of the cut-parts was significantly (P<0.05) reduced by the inclusion of the test ingredient (FPPHW). This could be due to the low fat content (1.73%) of roasted FPPHW (Omoikhoje and Odebala, 2001). Except for gizzard and lungs, there was no evidence to suggest that the inclusion of roasted FPPHW meal had any negative effect on the organ weights. The increase (P<0.05) in the

Table 5 : Carcass yield of broiler finishers fed the dietary treatments.

	Inclusion levels of FPPH (%)				
	0	10	20	30	
	Diets				
Parameters	1	2	3	4	SEM±
Average liveweight (kg/bird)	1.93 [b]	1.98 [ab]	2.02 [a]	1.92[c]	0.76
Plucked weight (kg/bird)	1.83 [b]	1.90 [a]	1.92 [a]	1.80 [b]	0.76
Eviscerated weight (kg/bird)	1.64 [b]	1.71 [b]	1.81[a]	1.68 [b]	0.61
Dressed weight (%)	84.95	86.36	89.60	87.50	0.99
Cut parts (%)					
Drumstick	168	16.61	15.95	16.16	0.22
Thigh	18.90	19.35	18.74	19.15	1.41
Breast	22.70	23.39	24.20	22.15	2.12
Back	17.62	18.92	19.66	19.40	0.63
Neck	5.80	6.20	5.75	6.26	0.16
Head	3.84	4.53	5.01	4.96	0.01
Shank	6.81	6.90	7.34	7.35	0.08
Wings	15.00	14.98	14.89	14.20	0.93
Abdominal fat	1.05 [a]	0.89 [a]	0.68 [b]	0.57 [b]	0.16
Organ weights (%)					
Gizzard	3.94 [c]	5.54 [b]	6.16[a]	6.26[a]	0.09
Liver	2.66	2.32	2.93	2.95	0.11
Lungs	0.83 [a]	0.77 [b]	0.72 [c]	0.83[a]	0.01
Heart	0.82	0.81	0.84	0.84	0.27
Kidney	0.24	0.25	0.24	0.27	0.01
Bursa	1.01	1.12	1.10	1.06	0.04
Pancreas	0.47	0.49	0.49	0.50	0.11

abc: Means in the same row with varying superscripts differ significantly (P<0.05).

relative weight of gizzard with a corresponding increase in the inclusion levels of roasted FPPHW might be attributed to the high fibre content (25.63%) of FPPHW. The variation (P<0.05) in the relative weights of lungs did not follow a specific pattern and so, such differences could be unconnected to the test diets. The comparable relative weights of the organs might be ascribed to the balance of nutrients in the test diets which lend support from the reports of Arijeniwa and Omoikhoje, (2003), Ademola *et al* (2004).

CONCLUSION

The results of this study revealed that the inclusion of roasted fluted pumpkin pod husk waste which hitherto constituted environmental nuisance could be used as a dietary fibre source. Broiler chickens could tolerate up to 20% FPPH waste in their diets without any adverse effect.

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