REPLACEMENT VALUE OF MAIZE OFFAL FOR MAIZE IN DIETS FOR PULLET CHICKS.

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ABSTRACT
A seven week (49 days) study was carried out to determine the replacement value of maize offal for maize in diets for pullet chicks. Ninety day old pullet chicks were randomly divided into five treatments of 18 birds per treatment. Each treatment was replicated three times with six birds per replicate. The five treatments T1, T2, T3, T4, and T5 were fed five diets in which maize offal replaced maize at 0%, 25%, 50%, 75% and 100% respectively for seven weeks .Samples of the five experimental diets were analyzed for their proximate composition using the methods of AOAC (2000) The experimental design was a completely randomized design (CRD). Data were subjected to a one way analysis of variance (ANOVA). Significant treatment means were separated using Duncan's multiple range test. with the aid of SPSS version 23 , 2015 edition .Daily feed intake ranged from 28.77g – 34.60g, the values increased steadily from T1 – T5 and were significantly different. Total weight gain and daily weight gain followed increased steadily from T1 – T5 showed significant (P<0.05) differences. Feed conversion ratio improved steadily from T_5 (18.44) to T_1 (11.64) with T_1 and T2 having the best. Feed cost (Kg/₦) decreased steadily from T_1 (153.00) to T_5 (47.50). Feed cost/g weight gain followed the same trend
It was therefore concluded that maize offal can replace maize in diets for pullet chicks at 25% level of inclusion with out adverse effects on feed intake, feed conversion ratio and daily weight gain as well as reducing feed cost per kg by 18.30%
Further studies should explore other replacement levels of maize offal for maize as well as other breeds and classes of poultry

Key Words: Replacement, Maize, Weight Gain, Feed Cost, Pullet Chicks

INTRODUCTION

Poultry is the quickest source of meat and its production involves the least hazardous and arduous process in relation to other livestock enterprises (Obioha, 1992). Poultry are able to adapt to most areas of the world, have a rapid generation time and a high rate of productivity (Smith, 2001). Although, the contribution of poultry to human nutrition in the tropics is already appreciable, it is but a small fraction of what it could be under the present conditions. The greatest incentive to the domestic poultry owner is the fact that the birds find their own food and accommodation almost without any expenses to him and that every thing they produce from faecal fraction to eggs and flesh earn him a net profit.

Feed cost accounts for 65 – 75% of the cost of poultry production (Fatokun *et al* 2010) and in bracing up the challenge of high cost of feeds , poultry operators are constantly making efforts to explore alternative fed ingredients(Eko *et al* 2020) The cost of conventional feed stuffs, which are the major sources of energy and protein in poultry diets, have continued to rise (Defang *et al*., 2008; Ocheja *et al* 2012; Eko *et al* 2020) due to their short supply. There is also stiff competition between human consumers, industrial processors and other users, for conventional feed stuffs like maize, sorghum, soybean and fish meal (Agbede *et al.,* (2002). This has resulted in the high cost of poultry feed, causing economic loses in poultry production in Nigeria. There is therefore, the need to continue to source for alternative sources of energy and protein that are not likely to face such competition and demand as the conventional feedstuffs. Such a feedstuff should not be food for man and should also have very limited or no industrial use.

To counter this increase in the price of conventional feedstuff and produce poultry products at affordable prices, the use of agro-industrial by-products in poultry feeding must be exploited in Nigeria. There is evidence in literature that the use of agro-industrial by products reduces the cost of feed as they attract little pricing (Onuh, 2005). One of such readily available agro-industrial by-products is maize offal. According to Ukah,(2004) maize offal contains 13.92% crude protein,7.20% crude fibre and 63.21% nitrogen free extracts while maize meal contains 10.82% crude protein, 4.27% crude fibre and 76.98% nitrogen free extracts. (Ocheja *et al* 2011)

The search for cheaper feedstuff continue to be very central to the research efforts of animal nutritionists in the tropics because of the critical need to find alternative less expensive feed ingredients that can substitute for the more conventional feedstuff in feeding animals

The aim of this study therefore was to evaluate the performance and feed cost parameters with a view to establishing the replacement value of maize offal for maize in diets for pullet chicks.

MATERIALS AND METHODS

The feeding trial was carried out at the poultry unit of Kogi State University Livestock Teaching and Research Farm, Anyigba located in the derived Guinea Savanna zone of Nigeria on latitude 7^0 6' N and longitude 6^0 43^0E. The area is characterized by about 6 to 7 months of rainfall ranging from 1400-1500mm annually. The ambient temperature average in Anyigba ranges from 25^0C to 35^0C with highest in March and April (Kowal and Knabe, 1972)

Ninety (90) day old pullet chicks were purchased and used for the feeding trial. The day old chicks were brooded using kerosene stove, metal hovers and electric bulbs as source of light in a deep litter house. The birds were randomly allotted to five treatment diets after brooding for three weeks. There were 18 birds in each treatments. Each treatment was replicated three times with each replicate having 6 birds . Feeds and water were provided *ad libitum*.

Health management practice included the administration of Vitalyte, Peneteryl, Keproceryl, Gumboro and Lasota vaccines, Antistress, Antibiotics and Vitamins and Mineral supplements were also administered during the period of brooding and rearing.

There were five dietary treatments in which maize offal replaced maize at 0%, 25%, 50%, 75% and 100%

The experimental design was a completely randomized design (CRD). Parameters measured were ,daily feed intake, daily weight gain, feed conversion ratio (FCR) and feed cost/kg. Initial weights of pullet chicks were determined by weighing them per replicates after three weeks brooding when the experiment began. Weight gain was determined by subtracting initial live weight from the final live weight. feed intake was determined by subtracting final weight of feeds from the initial weight of feeds. Feed conversion ratio was determined as feed intake divided by weight gain, while feed cost per kg weight gain was calculated as feed conversion ratio multiplied by Cost/kg feed.

Samples of feeds were analyzed for their proximate composition using standard procedure (AOAC, 2000)

Data collected were subjected to a one-way analysis of variance (ANOVA) and significant differences between treatment means were tested using Duncan's Multiple Range Test (DMRT)contained in SPSS version 23 (2015) edition.

Table 1: Composition of Experimental Diets.

Ingredients	Treatments				
	T1	T2	T3	T4	T5
Maize	60.00	45.00	30.00	15.00	0.00
Maize Offal	0.00	15.00	30.00	45.00	60.00
Bambara Nut Offal	37.00	37.00	37.00	37.00	37.00
Bone Meal	2.00	2.00	2.00	2.00	2.00
Table Salt	0.50	0.50	0.50	0.50	0.50
Premix	0.50	0.50	0.50	0.50	0.50
Total	100	100	100	100	100

RESULTS AND DISCUSSION

PROXIMATE COMPOSITION OF EXPERIMENTAL FEEDS

The Proximate composition of the experimental feeds are summarized in Table 2

Table 2: Proximate Composituion of Experimental Diets.(%)

Ingredients	Treatments				
	T1	T2	T3	T4	T5
Crude Protein	20.50	20.80	21.30	21.80	22.00
Crude Fibre	6.50	6.70	6.90	7.25	7.45
NFE	60.52	60.35	60.29	59.60	59.25
Ash	5.00	5.30	5.70	5.90	6.25
Ether Extracts	4.70	4.50	4.30	4.20	4.01

*NFE – Nitrogen Free Extracts

Performance of Pullet Chicks fed Diets Containing Varying Levels of Maize and Maize Offal

The performance of pullet chicks fed diets containing varying levels of maize and maize offal is presented in Table 3

The mean initial weights of the pullets were not significantly (P>0.05) different, meaning that the

pullets had similar weights across the treatments at the commencement of the experiment .There were significant (P<0.05) differences in the final, total and daily weight gain(1.56 – 2.79g) of the pullets. The values for dally weight gain were lower than 4.16 – 7.74g reported by Ocheja *et al* (2012) for pullet chicks and 76.95g – 86.96g obtained by Eko *et al* (2020) for broiler chics, these differences could be due to ration composition as well as class of birds used for the experiments. This result was in agreement with the reports of Amaefule and Osuagwu, (2008) and Ani *et al* (2013) who both observed significant (P<0.05) differences for all the parameters above . Daily feed intake (28.77g – 34.60g) showed significant (P<0.05) difference. The pullet chicks in treatment 5 (60% maize offal) had the least values for all the feed intake and growth parameters determined, this could be due to feed composition (Acamovic, 2001) as against nutrient deficiency. Feed conversion ratio improved steadily from $T_{5\ (18.44}$) to $T_{1(\ 11.64}$) and were significant (P<0.05), these values were inferior to 4.90 – 10.10 obtianed by Ocheja *et al* (2012) and 2.02- -2.56 reported by (Eko *et al* 2020), these discrepancies. could be due to the composition of the rations.

Table 3: Performance of Pullet Chicks fed Diets Containing Varying Levels of Maize and Maize Offal

PARAMETERS	Treatments					
	T_1	T_z	T_3	T_4	T_5	SEM
Mean Initial Weight (g)	69.85	70.20	70.95	70.80	71.00	0.79
Mean Final Weight Kg)	215.55[a]	214.00[a]	180.40[b]	160.35[c]	147.50[d]	5.58
Total Weight Gain	145.70[a]	143.80[a]	109.45[b]	89.55[c]	76.50[d]	4.77
Daily Weight Gain((g/day)	2.97[a]	2.93[a]	2.23[b]	1.82[c]	1.56[d]	0.78
Daily feed intake (g)	34.60[a]	33.90[a]	30.15[b]	30.67[b]	28.77[c]	0.43
Feed Conversion Ratio	11.64[a]	11.56[a]	13.52[b]	16.85[c]	18.44[d]	0.56

a,b,c,d = Treatment means on the same row with different super scripts differ significantly (P<0.05)
SEM = Standard Error of Mean

Feed Cost Analysis of Pullet Chicks fed Diets Containing Varying Levels of Maize and Maize Offal

The feed cost analysis of pullet chicks fed diets containing different levels of maize and maize offal is summarized in Table 4

Feed cost/kg (47 – 153 Naira), feed cost /g weight gain (0.87 – 1.77 Naira) and % reduction in feed cost /kg (0.00 – 69.60%) were all significantly (p<0.05) different, cost of feed consumed/day and reduction in feed cost (Naira) also followed similar trend as above. These results were in line with those of Ocheja *et al* (2012) and Ani *et al* (2013).who both recorded significant differences with pullet chicks. The values for feed cost/g weight gain and feed cost /kg were in agreement with those of Ameafule and Osuagwu (2008) who replaced soya bean meal and maize with bambara nut offal

Table 4: Feed Cost Analysis of Pullet Chicks fed Diets Containing Varying Levels of Maize and Maize Offal (Naira)

Parameters	Treatments					
	T1	T2	T3	T4	T5	SEM
Feed Cost /kg	153.00	126.00	102.00	70.00	47.50	9.05
Cost of Feed Consumed/day	5.29	4.27	3.08	2.14	1.37	0.09
TotalCostofFeedConsumed	259.21	209.23	150.92	104.86	67.54	
Feed Cost/g Weight Gain	1.77	1.46	1.37	1.17	0.87	0.04
Reduction in Feed Cost/kg	0.00	28.00	51.00	83.00	106.50	12.88
% Reduction in Feed Cost/kg	0.00	18.30	33.33	45.75	69.60	8.00

a, b, c,d = Means on the same row with different superscripts are significantly (P < 0.05) different.
SEM = Standard Error of Mean

CONCLUSION

Twenty five (25%) Maize offal can replace maize in diets for pullet chicks without adverse effects on fed intake , feed conversion ratio and daily weight gain as well as lowered cost of feed per kg by 18.30%

RECOMMENDATIONS

Further research should explore other levels of replacement
as well as other classes of poultry

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