THE EFFECT OF REPLACING MAIZE WITH HIGH QUALITY CASSAVA PEEL ON STARTER PHASE GROWTH PERFORMANCE OF BROILER CHICKENS

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ABSTRACT
A feeding trial was conducted to evaluate the effect of replacing maize with High Quality Cassava Peel (HQCP) on the starter phase growth performance of broiler chicken. The experiment took place at the Teaching and Research Farm of Ekiti State Polytechnic, Isan-Ekiti, and it lasted 21 days. A total of 150 day old chicks (Arbor acre strain) were brooded for a week before being randomly allotted to five experimental treatments in a completely randomized design, such that treatment (T1) served as control with 100% maize, while T2, T3, T4 and T5 had 25%, 50%, 75% and 100% HQCP replacement of maize. Each experimental treatment was replicated three times with 10 birds each. Parameters measured included the daily feed intake (DFI), daily weight gain (DWG), feed conversion ratio (FCR), final body weight (FBW) and mortality. The results showed significant (P<0.05) difference on the FBW, DWG and FCR. T1, T2 and T3- had the highest FBW, DWG and FCR, which are statistically similar and statistically difference from T4 and T5. The least FBW, DWG and FCR were recorded from T5 as 745.51g, 14.7g and 3.18 respectively. It was concluded that replacement of maize up to 50% with high quality cassava peel (HQCP) in broiler starter diets improved growth performance.
Keywords: HQCP, broilers, FCR, body weight changes, FBW and DWG.

INTRODUCTION

Feed constitutes a substantial portion, ranging from 60% to 80%, of the overall production costs in intensive broiler production (Babatunde *et al.,* 2021). The escalating expenses associated with feed resources in livestock production pose a significant challenge, particularly in meeting the escalating demand for animal protein, especially in developing nations like Nigeria (Miassi and Dossa, 2023). Recognizing the hindrance posed by these rising costs, there has been a directed research effort to explore strategies that could mitigate the financial burden of feeding without compromising the growth performance of broiler birds. Energy sources contribute the largest quantity in poultry rations, which usually contributes 50 -70 in broiler's feeds (Alves *et al.,* 2023). Among cereal grains, maize stands out as the prevalent source of energy in poultry production. Nevertheless, its extensive use is constrained by competition with human consumption, the beverage industry, and other livestock sectors (Erenstein *et al.,* 2022). The persistent reliance on maize could lead to a perpetual surge in livestock-related costs and subsequently affect livestock products. Unconventional feedstuffs, such as cassava peel meal, have emerged as a viable substitute for maize in poultry rations. Cassava peel has been used for decades to feed livestock, particularly ruminants and pigs (Amole *et al.,* 2022). Cassava peel is less competed for by humans and animals, when well processed will lower cost of feed, increase gross income of farmer and increase consumption of broilers in Nigeria.

MATERIALS AND METHODS

Experimental site: This trial was conducted at the Teaching and Research farm of Ekiti State Polytechnic Isan-Ekiti, located within the campus.

Test Ingredient

The test ingredient was the High Quality Cassava Peel (HQCP). The processed cassava peel was purchased from International Livestock Research Institute (ILRI), located within the campus of the International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria.

Experimental Birds, Design and Management

A total of 150 1-day-old Arbor Acres broiler chicks were sourced from a reputable hatchery in Ibadan, Oyo State. The birds were acclimatized for a week prior to the start of the experiment. At day 7, one hundred and fifty (n=150) healthy broiler chicks were individually weighed and birds with weight close to group mean were randomly assigned to five isonitrogenous and iso-caloric experimental

dietary treatments (T). Control diet (T1) was a maize based diet with 100% maize; T2 with 25% HQCP; T3 with 50% HQCP; T4 with 75% HQCP; and T5 with 100% HQCP respectively in replacement of maize. Each treatment consisted of 30 birds in 3 replicates of 10 birds each. The birds were offered diets and water ad-libitum throughout the experimental period. Standard management practices and routine vaccination were strictly observed. A floor space density of 0.3-m^2 per bird was maintained. The experimental diet was shown in Table 1.

Table 1: Gross Composition of Experimental Diet

Ingredients	**Control 0%**	**T2 (25%)**	**T3 (50%)**	**T4 (75%)**	**T5 (100%)**
Maize	59.00	44.25	29.50	14.75	0.00
HQCP	0.00	14.75	29.50	44.25	59.00
Soyabean	31.00	31.00	31.00	31.00	31.00
Wheat offal	4.19	4.19	4.19	4.19	4.19
Bone meal	2.20	2.20	2.20	2.20	2.20
Fish meal	3.00	3.00	3.00	3.00	3.00
Premix	0.01	0.01	0.01	0.01	0.01
Common Salt	0.50	0.50	0.50	0.50	0.50
Methionine	0.05	0.05	0.05	0.05	0.05
Lysine	0.05	0.05	0.05	0.05	0.05
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Crude protein	21.63	21.82	21.88	21.86	21.67
Crude fibre	7.85	7.55	7.32	6.10	8.48
ME (Kcal/g)	3168.18	3182.60	3186.32	3186.43	3197.23

HQCP- High Quality Cassava Peel; ME- Metabolizable Energy
Control 0% - 0% HQCP replacement
T2 (25%) - 25% HQCP replacement
T3 (50%) - 50% HQCP replacement
T4 (75%) - 75% HQCP replacement
T5 (100%) – 100% HQCP replacement

Data Collection

Performance Characteristics

Daily feed intake (g/bird) was recorded while body weights were taken at the start and end of the feeding trial, for initial (W1) and final weight (W2). Weight gain was calculated as W2-W1. Feed conversion ratio (FCR) was calculated as feed intake per unit weight gain. Daily mortality records were taken and the percentage (%) mortality was determined at the end of each feeding trial.

Statistical Analysis

Data generated were subjected to analysis of variance using SPSS (V25) (SPSS, 2017) package. Means separation was done by Duncan's New Multiple Range Test following the procedure outlined by Steel and Torrie (1980).

RESULTS AND DISCUSSION

Table 2, shows the starter phase growth performance of broiler birds fed High Quality Cassava Peel in replacement of maize. There was no significant ($P<0.05$) difference among the treatment based on the performance characteristics except final body weight, daily weight gain and the feed conversion ratio of the bird. The birds on T2 recorded the highest daily weight gain (DWG), final body weight (FBW) and best feed conversion ratio (FCR) at four weeks. The result revealed that the values obtained for

Table 2: Performance Characteristics of Birds Fed Experimental Diets

Parameters	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	SEM	P-value
Initial weight (g/bird)	67.67	67.67	67.63	67.67	67.67	0.00	0.99
Final body weight, (g/bird)	947.22^{ab}	1038.54^{a}	969.68^{ab}	857.34^{bc}	745.51^{d}	50.64	0.02
Daily weight gain (g/bird)	24.23^{ab}	28.79^{a}	25.30^{ab}	20.22^{bc}	14.70^{c}	2.42	0.02
Daily feed intake (g/bird)	53.70	49.94	52.51	47.39	46.82	1.36	0.87
FCR	2.02^{ab}	1.69^{a}	2.07^{ab}	2.32^{c}	3.15^{d}	0.25	0.04
Mortality (%)	3.33	5.49	8.62	10.00	13.33	2.71	0.27

T1, T2 and T3 are statistically similar. This connotes that HGCP could actually substitute up to 50% level of maize without harmful consequence on the *weight gain, final weight and FCR of the broiler birds*. This report was in agreement with Bakare *et al*. (2021), who opined that substituting maize with cassava up to 50% did not have adverse affect on the growth performance of broiler chickens. At 25% and 50% inclusion levels, HQCP was able to supply energy that was similar to that of maize diet and thus met the birds' nutrient requirement. This report was in agreement with Smith (2003), who opined that substituting maize with cassava up to 50% did not have adverse affect on the growth performance of broiler chickens. It has been reported by several authors that the weight gain of broiler chickens was not deterred by diet comprising 50% cassava root meal (Bakare *et al.,* 2021). The least DWG, FBW and FCR were recorded for birds on T5 as 14.7g, 745.51g and 3.18, respectively. This could be attributed to the coarse nature of the diets and increase in the cyanide content of birds fed T5. Esonu and Udedibie (1993); reported that an increased amount of cyanide in a diet had harmful effects on the digestibility and nutrient utilization of birds. Thus, the observed reduced weight gain and poor feed conversion ratio manifested mainly on birds fed 100% HQCP diet could be accounted *to the gastro-intestinal tract (GIT)* inability to digest the coarse nature of the diet as opined by Dijkslag *et al.* (2020).

CONCLUSION

Based on the result from this study, it can be concluded that High Quality Cassava Peel could be used as energy source of broiler feed, thereby reducing production cost in the face of rising feed cost. However, substitution above 50% could lead to deleterious effects on the growth performance of broiler chickens.

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