

UTILIZATION OF YAM PEEL MEAL AS PARTIAL REPLACEMENT FOR MAIZE ON GROWTH RESPONSE AND CARCASS CHARACTERISTICS IN BROILER FINISHER

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Abstract

A 35-day feeding trial was conducted to assess the effectiveness of yam peel meal (YPM) as a partial substitute for maize in the diet of broiler chicks. The study utilized 120 day-old Anak 2000 broiler chicks, randomly divided into four treatment groups receiving diets containing 0%, 3%, 6%, or 9% YPM. Standard management practices, including *ad libitum* access to feed and water, were strictly followed. The results showed statistically significant differences ($p < 0.05$) among the treatments for all performance metrics, including final body weight, weight gain, feed intake, and feed conversion ratio (FCR). Carcass characteristics—such as dressed weight, chest, thigh, drumstick, wing, and head weights were also measured. Notably, birds fed with the 3% YPM diet achieved a significantly higher final body weight (2088g) than those on the 0% (1963.00g), 6% (1914.50g), and 9% (2016.00g) YPM diets ($p < 0.05$).

Key words: broiler chicks, carcass characteristics, growth response, maize meal, and yam peel meal

How to Cite: Adams, T. O., Raji, M. O., Ogunbode, A. A., Ogungbenro, S. D., Akinosun, A. A., Emiola, C. B., Olasunkanmi, A. M., and Adelodun, A. A. (2025). Utilization of yam peel meal as partial replacement for maize on growth response and carcass characteristics in broiler finisher. *OYSCATECH Journal of Science and Agricultural Technology*, 3(1), 31-35. <https://oyscitechpublications.org/>

Introduction

The deficit in animal protein in Nigeria and most developing nations is alarming and rampant and thus requires action to prevent a rising crisis of protein malnutrition. This has been a matter of great concern because of the expensive nature of the traditional feedstuff, which makes up the largest cost and expenditure in monogastric production of animals (Madubuike and Ekenyem 2001). According to Faniyi (2002), feed accounts up to 70-80 percent of the cost of poultry production and majority of this is taken up by maize. Poultry performance is, however, related to the quality and quantity of feed ingredients because birds must feed on a

sufficient level of energy, protein, vitamins, and minerals per day in order to perform optimally (Oluyemi and Roberts 2000). This has led to an urgency to explore other cheaper and locally available alternative feed sources like yam peels. Several agro-industrial byproducts such as wheat offal or citrus pulp have already been used in the broiler diets successfully (Faniyi 2002). The waste product of the yam processing, yam peels, can be fresh or sun-dried (4-7 days) in accordance with the temperature of the ambient environment to decrease the degree of moisture and inhibit the process of microbial fermentation. This study aimed to compare the performance of broiler

chicken and carcass traits of chickens fed yam peel meal as a partial alternative to maize.

Materials and methods

One hundred and twenty Anak 2000 broiler chicks aged 120 days were purchased in a reputable hatchery and transported to the Poultry Unit of Teaching and Research farm, Oyo State College of Agriculture and Technology, Igboora where the experiment was carried out. The brooding pens were fully cleaned and disinfected and fumigated with potassium permanganate and formalin four days before the chicks' arrival. Individual chicks were weighed and randomly allocated to twelve brooding units with each having ten chicks. The birds received four dietary treatments (0%, 3%, 6% and 9% YPM) with three replicates per dietary treatment. Each replicates received two chick feeders and two drinkers, and 24-hour lighting schedule was maintained throughout the brooding period. On arrival, chicks were treated with Neoceryl Plus® soluble powder to reduce stress and prevent bacterial infection. Vaccinations were carried out against infectious bursal disease on

days 7 and 21, and Newcastle disease on days 14 and 32 using chlorine-free water. The birds were raised in a deep litter system with wood shavings as bedding. After two weeks, they were relocated to rearing pens and then fed on their respective experimental diets until the completion of the 35 days trial period.

Experimental Site

The experiment was conducted at the Poultry Unit, Teaching and Research Farm, Oyo State College of Agriculture and Technology, Igboora, Oyo State, Nigeria.

Sourcing and Processing of Yam Peel Meal (YPM)

Fresh yam peels were collected from local food vendors in Igboora, sun-dried for 4–7 days and milled using a hammer mill with a 2 mm sieve to produce homogenized yam peel meal.

Experimental Diets

One hundred and twenty broiler chicks were allocated to four dietary treatments containing 0%, 3%, 6%, and 9% YPM as partial replacements for maize in a completely randomized design.

Table 1: Composition of experimental diets for broiler finisher

Ingredients	T1(0% YPM)	T2(3% YPM)	T3(6% YPM)	T4(9% YPM)
Maize	54.00	51.00	48.00	45.00
Yam peel meal	0.00	3.00	6.00	9.00
Soyabean meal	5.50	5.50	5.50	5.50
GNC	17.5	17.5	17.5	17.5
PKC	10.00	10.00	10.00	10.00
Fishmeal	3.00	3.00	3.00	3.00
Wheat offal	5.20	5.20	5.20	5.20
Bone meal	4.00	4.00	4.00	4.00
Salt	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25
D-Methionine	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00
Calculated values				
CP %	20.00	20.05	20.11	20.17
MEKcal/kg	2843.92	2836.31	2828.74	2821.15

GNC: groundnut cake, PKC: palm kernel cake, CP: crude protein

Data Collection and Analysis

Live weights were measured using a sensitive digital scale at the start of the trial and then weekly. At the experiment's conclusion, one bird was randomly selected from each replicate, fasted for 24 hours, and then slaughtered via jugular vein severance for complete bleeding. Birds were defeathered in

warm water, eviscerated, and their internal organs and carcass parts were weighed. Carcass components which are: dressed weight, chest, drumstick, thigh, wing, and head were expressed as percentages of live weight following the method of Ojewole *et al.* (2000).

Table 2: Effect of yam peel meal as partial replacement for maize on growth response of broiler chicken at finisher phase

Parameters	T1(0% YPM)	T2(3% YPM)	T3(6% YPM)	T4(9% YPM)	SEM
Initial weight(g)	450.50	450.10	450.30	450.20	0.035
Final weight(g)	1963.50 ^c	2088.00 ^a	1914.5 ^c	2016.0 ^b	32.17
Weight gain(g)	1513.3 ^b	1637.90 ^a	1464.20 ^c	1565.8 ^b	32.21
Daily weight gain(g/d)	43.24 ^b	46.79 ^a	41.83 ^c	44.73 ^b	9.19
Total feed intake(g)	2870.71 ^b	2905.20 ^a	2880.10 ^b	2890.50 ^b	6.40
Daily feed intake(g/d)	82.02 ^b	83.01 ^a	82.29 ^c	82.59 ^d	1779.40
Feed Conversion Ratio	1.89 ^b	1.77 ^c	1.96 ^a	1.84 ^b	0.19

^{abcd} means on the same rows with different superscript are significantly (p<0.05) different

Table 3 Analysis of carcass characteristics of broiler fed yam peel meal

Parameters	T1(0% YPM)	T2(3% YPM)	T3(6% YPM)	T4(9% YPM)	SEM
Live weight (g)	1963.50 ^c	2088.00 ^a	1914.50 ^{bc}	2016.0 ^b	32.20
Dress weight	1853.50 ^b	1953.50 ^b	1755.50 ^{bc}	1832.00 ^c	35.17
Plucked weight	110.00 ^d	134.50 ^c	158.00 ^b	184.00 ^a	13.73
Dress %	94.37 ^a	93.56 ^b	91.75 ^c	90.87 ^{bc}	0.69
Cut part as % of Live weight					
Head	2.59 ^b	2.37 ^{bc}	2.58 ^c	2.65 ^a	0.06
Wing	7.74 ^c	7.88 ^b	9.14 ^a	7.66 ^c	0.30
Thigh muscle	09.55 ^b	09.79 ^a	9.53 ^b	09.10 ^c	0.22
Chest muscle	24.92 ^a	24.76 ^b	21.88 ^c	23.23 ^b	0.62
Drum stick	10.33 ^a	09.84 ^b	10.21 ^a	10.09 ^b	0.09
Shank	4.38 ^a	4.07 ^b	4.36 ^a	4.07 ^b	0.08
Back	12.71 ^a	11.94 ^d	11.56 ^c	12.22 ^b	0.21

^{a, b, c, d} means along the row with different superscript are significantly (p<0.05) different

Results and discussion

Table 2 showed that there were significant ($p < 0.05$) differences in weight gain, daily weight gain, total feed intake, daily feed intake, and feed conversion ratio (FCR) among the treatments. There was a significant ($p < 0.05$) difference in the final body weight of birds across the dietary treatments. There was a minor decrease in weight gain in broilers fed diet 3 (6% YPM) as opposed to control diet (0% YPM), diet 2 (3% YPM) and diet 4 (9% YPM). The daily feed intake was between 82.02 and 83.01 g/per bird. This is consistent with the results of Lawrence *et al.* (2018), who found a significant ($p < 0.05$) difference in the daily feed intake of a broiler fed on a corn-based diet with or without enzyme supplementation. Correspondingly, the average daily weight gain (41.83 - 46.79 g) in this research is similar to those of Onabanjo *et al.* (2021) who noted significant ($p < 0.05$) differences in average daily weight gain in broilers fed on diets containing alternative feed ingredients. The FCR was between 1.77 and 1.96, and there was a progressive rise with the increase in the level of yam peel meal inclusion. This tendency could be explained by the fact that YPM diets are higher in fibre and low in energy. There was no mortality at the experimental period, and this showed that the diets were acceptable to the birds.

Table 3 shows the effects of partially replacing maize with yam peel meal on carcass properties of broiler chicks. The treatments showed significant ($p < 0.05$) differences in terms of live weight, plucked weight, and dressing percentage. At moderate levels of YPM inclusion, birds fed 3% YPM (2088 g), 6% YPM (1914.50 g) and 9% YPM (2016.00 g) were significantly ($p < 0.05$) heavier than birds fed 0% YPM (1963.00 g). The observed differences in carcass characteristics might be because of different levels of methionine in diets. Sufficient intake of methionine has been found to facilitate growth and good physiological functioning in animals (Oruseibo and Wariboko, 2000). This result,

however, differ from Iyayi (2001) and Ekenyem and Madubuike (2006) who reported that an increase in the dietary fibre levels reduced growth performance. This difference may be explained by the fact that the lignin and complex compounds are relatively low in yam peel, and therefore its fibre fraction is more digestible. The highest drumstick weight as a percentage of live weight (10.33%) was recorded in birds fed the control diet (0% YPM), while the lowest value (9.84%) occurred in birds fed 3% YPM. The reduced yield of the drumstick in this group could be attributed to the variations in the capacity of the test diets to induce tissue deposition in certain portions of the body.

Conclusion and recommendations

According to the findings of the present research, yam peel meal can be incorporated into broiler feed for up to 9% of maize without negatively affecting performance and carcass traits. Growth response and feed cost decreased with increase in YPM levels, thus increasing profitability in broilers production.

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