

PERFORMANCE AND ECONOMY OF PRODUCTION OF BROILER FED MIXED SAW DUST, AS A SUBSTITUTE FOR WHEAT OFFAL

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Abstract

A study was conducted to evaluate the economic viability of using mixed sawdust as a substitute for wheat offal in broiler feed. The experiment involved 99 broilers, divided into three dietary treatments with three replicates of 11 broilers each. The treatments consisted of mixed sawdust substituting wheat offal at 0%, 40%, and 80% levels. The experiment lasted for three weeks and was designed as a Completely Randomized Design (CRD). Data were analyzed using ANOVA. Results showed significant differences ($p < 0.05$) across treatments. Broilers fed diet 3 (80% substitution) had the lowest feed cost (₦222.45/kg), while those fed diet 1 (0% substitution) had the highest feed cost (₦225.25/kg). However, broilers fed diet 3 had the highest cost of weight gain (₦240.25/kg), while those fed diet 1 had the lowest cost of weight gain (₦175.70/kg). Broilers fed diet 3 had the lowest feed cost per bird (₦360.34/kg) and the highest final live weight (1364.50g), while those fed diet 1 had the highest feed cost per bird (₦364.91/kg) and the lowest final live weight (1066.50g). Average weight gain was highest in broilers fed diet 3 (1076.40g) and lowest in those fed diet 1 (784.40g). Feed intake varied significantly across treatments, with broilers fed diet 2 (40% substitution) having the lowest intake (1617.60kg), and those fed diet 3 having the highest intake (1617.65kg). Overall, the study suggests that substituting wheat offal with mixed sawdust at 80% level can improve the economic viability of broiler production.

Keyword: *Economy of production, Broiler, Mixed saw dust and Wheat offal.*

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Introduction

The poultry industry in Nigeria and other African countries faces a significant challenge due to the rising cost of feeds, driven by intense competition for conventional feed ingredients. Researchers have explored alternative ingredients, including mixed sawdust, as a substitute for wheat offal in broiler feed, with moderate success (Ogunbenro et al., 2019). However, there is a need for further research to identify viable

unconventional ingredients that can replace wheat offal, reducing pressure on demand and costs. Discovering such alternatives can lower meat production costs (Ogunbenro et al., 2020). Ogunbenro (2020) recommends exploring non-conventional feed resources and incorporating them into broiler feed. Using mixed sawdust as a substitute for wheat offal can improve farmers' standard of living (Ogunbenro et al., 2019). This study aims to evaluate the economic viability of using mixed

sawdust as a substitute for wheat offal in broiler production.

Materials and Methods

Experimental site

The study was conducted at the Teaching and Research Farm, Oyo State College of Agriculture, Igboora, Nigeria, located in the savannah forest zone (latitude 7°15'N, longitude 3°30'E, elevation 140m above sea level). The area has a minimum temperature of 20.5°C, maximum temperature of 32.5°C, average humidity of 58.0%, and double maximum rainfall of 314.3mm in June and 165.2mm in September (Sanusi, 2011).

Experimental materials

Drinker, Feeder, Wood shaving, Charcoal pot, Broom, Bucket, Weight scale, Packer, Knife, Pot.

Experimental ingredient

The saw dust used in the experiment was obtained from the local saw mill, Igboora, Oyo State.

Experimental birds and management

Ninety-nine day-old broiler chicks were obtained from Zartech Farm Nigeria Limited and transferred to the Teaching and Research Farm. The brooding pen was cleaned, disinfected, and fumigated with potassium permanganate and formalin. The birds were weighed, allocated to 9 brooding units (11

birds per unit), and offered one of three dietary treatments. Each treatment had 3 replicates. The birds were maintained on a 24-hour constant light schedule, treated with neoceryl plus soluble powder, and vaccinated against infectious Bursal disease and Newcastle disease. They were also treated against coccidiosis and fed ad libitum throughout the experiment. The birds were managed under a deep litter system with wood **shavings as bedding material**.

Experimental Diets

Three experimental diets were formulated for the starter phase, with mixed sawdust substituting wheat offal at 0%, 40%, and 80% levels, respectively. The diets were fed for 3 weeks.

Statistical analysis

Data obtained subjected to one way Analysis of Variance (Nousis; 1999), mean value of variables showing significant ($p < 0.05$) difference were separated using Duncan's multiple range test (Duncan's; 1955).

Statistical model

$$Y_{ij} = \mu + T_i + \Sigma_{ij}$$

Y_{ij} = dependent variable

μ = Population mean or intrinsic factor

T_i = Effect of dietary inclusion of wheat offal and mixed saw dust

Σ_{ij} = residual error

Table 1. Proximate analysis of mixed saw dust and wheat offal

Parameters (%)	Saw-dust	Wheat offal
Crude Protein	10.50	15.61
Crude Fiber	18.99	8.50
Ether Extract	19.90	3.50
Ash	3.00	5.14
Moisture content	13.40	11.00

Table 2:- Gross Composition of Experimental Broiler Starter Diets

Percentage Ingredients	Replacement levels		
	0% T ₁	40% T ₂	80% T ₃
Maize	56.00	56.00	56.00
Soya bean meal	34.00	34.00	34.00
Wheat Offal	5.00	3.00	1.00
Saw Dust	00.00	2.00	4.00
Limestone	2.00	2.00	2.00
Bone Meal	2.00	2.00	2.00
Broiler Premix	0.25	0.25	0.25
Salt	0.25	0.25	0.25
DL- Methionine	0.25	0.25	0.25
L- Lysine	0.25	0.25	0.25
TOTAL	100.00	100.00	100
Metabolizable Energy (kcal/kg)	2934.79	2960.98	2987.17
Crude Protein (%)	21.75	21.62	21.49

A kg premix contains vitamin A; 110,000,000i μ Vitamin D; 2,500,00i μ , Vitamin E; 20,000mg Vitamin K₃; 3000mg, Vitamin B₃; 3.00mg Vitamin B₂; 7000mg, Vitamin B₆; 500mg Vitamin B₁₂; 25mg, Panthotenic acid; 10,000mg, folic acid; 800mg, Biotin; 50mg Manganese; 80,000mg, Iron; 40,00mg, Zinc; 60,000mg, Copper; 800mg, Cobalt; 250mg, Iodine; 1,000mg, Selenium (1%); 150mg, Chlorine, 200,000mg and Anti-oxidant; 100,00mg.

Results

Economy of Production

The economy of production of broilers fed mixed sawdust as a substitute for wheat offal is presented in Table 4. The results showed significant differences ($p < 0.05$) across dietary treatments. The lowest cost of feed (₦222.45/kg) was recorded in broilers fed diet 3 (80% substitution level), while the highest cost (₦225.25/kg) was recorded in broilers fed diet 1 (0% substitution level).

The cost of producing 100kg of feed was lowest in diet 3 (₦22245.00) and highest in diet 1 (₦22525.00). The highest cost of weight gain (₦240.25/kg) was recorded in broilers fed diet 3, while the lowest cost (₦175.70/kg) was recorded in broilers fed diet 1. The lowest cost

of feed per bird (₦360.34/kg) was recorded in broilers fed diet 3, while the highest cost (₦364.91/kg) was recorded in broilers fed diet 1.

Growth Performance

The final live weight and weight gain were significantly different ($p < 0.05$) across dietary treatments. The highest final live weight (1364.50g) and weight gain (1076.38g) were recorded in broilers fed diet 3, while the lowest values (1066.50g and 784.40g, respectively) were recorded in broilers fed diet 1. Feed intake was significantly different ($p < 0.05$) across dietary treatments, with the lowest value (1617.60kg) recorded in broilers fed diet 2 and the highest value (1617.65kg) recorded in broilers fed diet 3.

Table 3. Performance and Economy of production of broiler fed mixed saw dust as a substitute for wheat offal

Parameter	T ₁ 0%	T ₂ 40%	T ₃ 80%	SEM ±
Initial weight (g)	282.10 ^b	279.00 ^c	288.10 ^a	2.18
Final live weight (g)	1066.50 ^c	1173.00 ^b	1364.50 ^a	71.19
Weight gain (g)	784.40 ^c	894.00 ^b	1076.38 ^a	69.51
Feed intake	1617.64 ^{ab}	1617.60 ^c	1617.65 ^a	0.01
FCR	2.06 ^c	1.81 ^b	1.50 ^a	0.13
Cost of feed	225.25 ^a	223.85 ^b	222.45 ^c	0.66
Cost of weight gain	175.70 ^c	199.23 ^b	240.25 ^a	15.40
Cost of feed/bird	364.91 ^a	362.64 ^b	360.37 ^c	1.07

^{a,b,c} means on the same rows with different superscript differ significantly (p<0.05)

Discussion

The study also found that the feed conversion ratio (FCR) was significantly different (p<0.05) across dietary treatments, with the best FCR (1.50) recorded in broilers fed diet 3 and the poorest FCR (2.06) recorded in broilers fed diet 1.

The results of this study are consistent with previous findings that suggest that dietary fiber aids a healthier digestive process and supports the muscles and nerves (Kumuyi, 2016). The improved growth performance and reduced feed costs can be attributed to the increased ability of broilers to convert dietary energy from fat into stored energy, thereby permitting a greater increase in dietary intake (Carem and Hill, 1964; Jensen et al., 1970).

The results of this study indicate that substituting wheat offal with mixed sawdust at 80% level reduces the cost of feed and improves the economy of production. This finding is consistent with previous studies (Ogungbenro et al., 2019; Ogungbenro et al., 2016) that reported reduced feed costs with increased substitution levels of mixed sawdust for wheat offal. The improved growth performance and reduced feed costs can be attributed to the increased ability of broilers to convert dietary energy from fat into stored energy, thereby permitting a greater increase in dietary intake (Carem and Hill, 1964; Jensen et al., 1970).

The feed conversion ratio (FCR) was also improved in broilers fed diet 3, indicating that

they were able to utilize the feed more efficiently. This is likely due to the higher energy density of diet 3, which allowed the broilers to meet their energy requirements more easily. The results of this study are also consistent with previous findings that suggest that dietary fiber aids a healthier digestive process and supports the muscles and nerves (Kumuyi, 2016). The inclusion of mixed sawdust in the diet may have helped to improve the gut health of the broilers, leading to improved growth performance and reduced feed costs.

Conclusion

The use of mixed sawdust as a substitute for wheat offal reduces the cost of production and improves the economy of broiler production, resulting in increased profitability for poultry farmers and improved standard of living.

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