EVALUATION OF COST-BENEFIT OF NOILER CHICKENS FED DIETARY REPLACEMENT LEVELS OF MAIZE WITH TOASTED BAMBARA NUT SIEVATE-YAM PEEL MEAL COMPOSITE WITH OR WITHOUT LACTIC DRY®

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ABSTRACT
A 16 weeks feeding trial was conducted to evaluate cost-benefit of replacing maize with toasted Bambara nut sievate-yam peel meal composite (TBNS-YPMC) in diets of noiler birds using 180 of 14-day old chicks. Birds were divided in 2 groups of 90 birds which had 3 sub-groups of 30 birds with 3 replicates of 10 birds each. The experiment was laid on 2 x 3 factorial with one of the two groups fed diets: T_1 control, T_2:20 and T_3:40% of TBNS-YPMC replacing maize without Lactic Dry® (LD) while the other group was fed same diets with LD. Results revealed control diet with LD and diet containing 40% TBNS-YPMC without LD had highest (₦362.34) and least (₦321.40) cost per Kg of diet, respectively. Feed cost per kg of weight gain was highest (₦1,844.84) and least (₦1,745.31) for control diet without LD and diet containing 40% TBNS-YPMC without LD, respectively. Total production cost was highest (₦4,254.15) and least (₦3,844.99) for birds fed control diet with LD and diet containing 40% TBNS-YPMC with LD, respectively. Highest (₦2,155.01) and least (₦1,745.85) gross profit was made on birds fed diet containing 40% TBNS-YPMC with LD and control diet with LD, respectively. In conclusion, TBNS-YPMC can replace maize in noiler chickens diets up to 40% with LD to reduce cost per kg diet, total cost of production and improved gross profit.
Keywords: Noiler, Growth, Cost, Peel, Sievate

INTRODUCTION

The call for urgent interventions to drive down the cost of feed input in Nigeria and make animal protein affordable to households has been intensified due to alarming reduction in daily animal protein intake of majority of poor Nigerians (Uza *et al*., 2024). In this regards, Animal nutritionist in Nigeria has embarked on researches geared towards the deployment of breeds of animals with high meat, egg production, genetic potential for utilization of poor quality feed, hardy, resistant to most diseases and adaption to our local environmental conditions. Similarly, agricultural wastes which are non-products output of agricultural products that may contain materials that can be beneficial to man but whose economic values are less than their cost of collection and processing for beneficial use could be central in producing affordable poultry meat and eggs (Mamo and Zewide, 2022). Common amongst these agricultural by-products are Bambara nut sievate (BNS) and yam peels (YP) which can be incorporated in the diets of livestock to boast their performance and reduce cost of their edible products (Uza *et al.,* 2024). In the same vein, Amaefule *et al*. (2011) observed that that inclusion of Bambara nut offal (BGO) in rabbits' diets decreases feed cost per kg. Similarly, Uza *et al*. (2024) observed that replacing maize with toasted bambara nut sievate-yam peel meal composite in diets of noiler chicks' decreases feed cost per kg, reduce production cost and improve profit margin.

MATERIALS AND METHOD

Experimental Site

The study was conducted at the Poultry Unit of the Livestock Teaching and Research Farm, Joseph Sarwuan Tarka University, Makurdi, Benue State, Nigeria.

Collection and Preparation of Bambara Nut Sievate

The Bambara nut sievate (BNS) was purchased at Ushongo Town, Ushongo Local Government Area of Benue State. Five kilograme of raw BNS was thoroughly mixed with 500 mls of water, toasting materials was turned frequently until it turned light-brown with a sweet smell and allowed to cool before use.

Collection and Preparation of Yam Peel

Fresh yam peel was collected from local yam farmers within Makurdi, its environs and sun-dried (5-7 days) until a constant weight was obtained. The dried yam peel was milled for use.

Experimental Diets

Six diets were formulated with toasted bambara nut sievate (TBNS) - yam peel meal (YPM) composite (1:1) replacing maize in the diets at 0, 20 and 40% with or without Lactic Dry® (LD) and denoted as T1, T2 and T3, respectively (Table 1 and 2).

Table 1: Nutrients Composition of Noiler Chicks' Starter Diets Containing Graded replacement of Maize with BNS-YPM Composite

	Dietary replacement levels of Maize with TBNS-YPM Composite (%)					
	No Lactic Dry®			Lactic Dry® (0.25 g/ kg diet)		
Ingredients (Kg)	**0**	**20**	**40**	**0**	**20**	**40**
Maize	31.33	25.06	18.80	31.33	25.06	18.80
BNS-YPMC	00.00	6.27	12.53	00.00	6.27	12.53
FFSB	54.27	54.27	54.27	54.27	54.27	54.27
Maize Offal	10.00	10.00	10.00	10.00	10.00	10.00
Bone ash	3.50	3.50	3.50	3.50	3.50	3.50
Salt	0.30	0.30	0.30	0.30	0.30	0.30
Lysine	0.10	0.10	0.10	0.10	0.10	0.10
`Methionine	0.25	0.25	0.25	0.25	0.25	0.25
Vit. Premix	0.25	0.25	0.25	0.25	0.25	0.25
Total	**100**	**100**	**100**	**100**	**100**	**100**
Calculated Proximate Nutrients Composition						
Crude protein	24.00	24.21	24.40	24.00	24.21	24.40
Crude fibre	4.54	5.18	5.83	4.54	5.18	5.83
Ether extract	2.51	2.38	2.24	2.51	2.38	2.24
Ash	2.99	3.13	3.25	2.99	3.13	3.25
ME (Kcal/Kg)	3116.16	3071.99	3027.90	3116.16	3071.99	3027.90

TBNS-YPMC= Toasted Bambara nut sievate-Yam Peel Meal Composite, FFSB= Full Fat soybeans, ME= Metabolisable Energy and Kcal= Kilocalories.

**Vitamin premix contains B1, 1g; B2,6g; B12,0.02g; K3,3g; E,3g; Biotin,0.05g; Folic acid,1.5g; Cholinechloride,250g; Nicotineacid,30g; Ca- pantothenate,15g; Co,0.4g; Cu,8g; Fe,32g; I,0.8g; Zn,40g; Mn,64g; Se,0.16g, BHT,5g.*

Table 2: Ingredients and Proximate Nutrient Composition of Noiler Chickens Finisher Diets Containing Graded Replacement of Maize with BNS-YPM Composite

	Dietary replacement levels of Maize with TBNS-YPM Composite (%)					
	No Lactic Dry®			Lactic Dry®		(0.25 g/ kg diet)
Ingredients (Kg)	**0**	**20**	**40**	**0**	**20**	**40**
Maize	51.49	41.19	30.89	51.49	41.19	30.89
BNS-YPMC	00.00	10.30	20.60	00.00	10.30	20.60
FFSB	28.96	30.03	30.03	30.03	30.03	30.03
Maize Offal	15.00	15.00	15.00	15.00	15.00	15.00
Bone ash	3.50	3.50	3.50	3.50	3.50	3.50
Salt	0.30	0.30	0.30	0.30	0.30	0.30
Methionine	0.25	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25	0.25
Vit. Premix	0.25	0.25	0.25	0.25	0.25	0.25
Total	**100**	**100**	**100**	**100**	**100**	**100**
Calculated Proximate Nutrient Composition						
Crude protein	17.00	17.34	17.67	17.00	17.34	17.67
Crude fibre	4.28	5.33	6.40	4.28	5.33	6.40
EE	3.02	2.80	2.59	3.02	2.80	2.59
Ash	1.79	2.02	2.23	1.79	2.02	2.23
ME (Kcal/Kg)	3,097.82	3,025.26	2,952.71	3,097.82	3,025.26	2,952.71

Birds, diets and rearing management

A total of 200 day-old unsexed noiler chicks were purchased from Amo hatchery in Ibadan, allowed two-week for acclimatization. Thereafter, one hundred and eighty 14-day old noiler chicks were selected, weighed and divided in two main groups of 90 chicks each. Each group was sub-divided into 3 sub-groups of 30 birds and then replicated

thrice with 10 birds each. The first group was offered diets; T1: 0, T2:20 and T3:40% of TBNS-YPMC replacing maize, respectively without LD while the second group was offered the same diets with LD. The experiment was a 2 x 3 factorial in arrangement. The study lasted four months while feed and water were offered *ad-libitum*. vaccination scheduled and drugs were administered appropriately.

Data Collection

Cost- benefit Analysis

Cost (₦) per kg diet- Aggregate of the individual cost contribution of feed ingredients used to formulate 100kg diet divide by 100.

Cost (₦) of feed consumed - Total feed consumed multiply by their respective cost per kg diet.

Feed Cost per Kg Gain - The product of the feed conversion ratio and feed cost per kilogramme.

Total production cost (₦)- The summation of the cost (₦) of the whole operation including the Cost (₦) of feed consumed and of birds.

Gross profit- The difference between price per bird and total production cost per bird.

RESULTS AND DISCUSSION

Results on cost-benefit analysis of production of finisher noiler chickens fed diets containing replacement levels of maize with TBNS-YPMC with or without LD (Table 3) revealed that cost per Kg diet was highest (₦362.34) and least (₦321.40) for control diet supplemented with LD and diet containing 40% TBNS-YPMC without LD supplementation, respectively. Reduction in cost per Kg of diet due to replacement levels of TBNS-YPMC in this study agrees with the report of Amaefule *et al*. (2011) who observed a reduction in feed cost due to inclusion of Bambara groundnut offal (BGO) that subsequently increased farmers' income. Feed cost per kg weight gain of noiler chicken was highest (₦1,844.84) for diet containing 40% TBNS-YPMC and least (₦1,745.31) on diet containing 40% TBNS-YPMC replacing maize with LD supplementation. Tuleun *et al*. (2020) reported that inclusion of 30% BGO in enzymes supplemented broiler chickens' diets reduce feed cost per kg weight gain of broiler finisher chickens which is in consonant with the findings of this study. Total cost of production per noiler chicken was highest (₦4,254.15) for birds control diet with Lactic Dry® supplementation while birds on diet containing 40% TBNS-YPMC replacing maize with Lactic Dry® supplementation recorded least (₦3,844.99) for total cost of production. Birds fed diet containing 40% TBNS-YPMC replacing maize with Lactic Dry® supplementation had highest gross profit (₦2,155.01) compare to those on control diet with Lactic Dry® supplementation which had least (₦1,745.85) gross profit. Oguntoye *et al*. (2018) reported that broiler chickens fed diets containing graded levels of YPM (0, 15 and 30%) with or without enzymes (50 g/100 Kg diet) as replacement for maize improved farmers profit due to reduction in the cost of production. This implies that replacement of maize and or any other conventional expensive feedstuff using agricultural waste will definitely go a long way to reduce production cost and boost producers profit which corroborates the findings of Uza *et al*. (2024) who observed improved gross profit when toasted bambara nut sievate-yam peel meal composite replaced maize diets of noiler chicks.

Table 3: Cost-benefit Analysis of Production of Noiler Chickens using dietary replacement levels of maize with TBNS-YPMC supplemented with or without Lactic Dry®

	Dietary replacement levels of Maize with TBNS-YPM Composite (%)					
	No Lactic Dry® supplementation			Lactic Dry® supplementation		
Ingredients	0	20	40	0	20	40
DOC (₦)	300.00	300.00	300.00	300.00	300.00	300.00
Vaccine/Drug (₦)	330.75	330.75	330.75	330.75	330.75	330.75
Cost/Kg diet (₦)	362.32	345.75	321.40	362.34	345.78	321.42
Total feed intake (kg)	9.76	9.49	10.14	10.00	10.12	10.00
Feed conversion ratio	5.04	5.17	5.74	4.93	5.09	5.43
Feed cost/kg weight gain (₦)	1,826.09	1,787.53	1,844.84	1,786.34	1,760.02	1,745.31
Cost of feed consumed (₦)	3,536.24	3,281.17	3,259.00	3,623.40	3,499.29	3,214.20
Cost of production (₦)	4,196.99	3,911.92	3,889.75	4,254.15	4,130.04	3,844.99
Gross profit (₦)	1,803.01	2,088.08	2,110.25	1,745.85	1,869.96	2,155.01

DOC= Day old chicks, Kg= Kilogramme and ₦= Naira. Each noiler bird was sold at ₦6,000.00

CONCLUSION

It is concluded that TBNS-YPMC can replace maize in noiler chickens diets up to 40% with LD to reduce cost per kg diet, total cost of production and improved gross profit.

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