COST-BENEFIT ANALYSIS OF BROILER CHICKENS FED DIFFERENT PROTEIN SOURCES UNDER DIFFERENT PROCESSING METHODS

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Abstract
An experiment was conducted to determine the cost benefit analysis of broiler chickens fed differently processed plant protein sources. Two hundred and fifty day seven days old Anak 2000 broiler chicks were randomly allotted to different processed protein sources which include cooked soyabean, salt-treated African locust bean, and sprouted bambaranut with industrial based groundnut cake serving as control. There were 62 birds per treatment replicated five times in a randomized completely block design (RCBD). Economic analysis was conducted based on the prevailing price of ingredients in the study area. Results showed feed cost were lower in groundnut cake diet (₦77.76) and highest in sprouted bambaranut (₦84.63). The total feed cost was highest in sprouted bambaranut (₦372.22). The total gain was highest in cooked soyabean diet (3.00kg). The cost per kg gain was lowest in cooked soyabean (₦126.43) and highest in groundnut cake diet (₦158.34). The cooked soyabean is the least cost ration.

***Key words:** African locust bean seeds, broilers, economic analysis, processing*

Introduction

The high cost of feed is blamed on the competition between man and his livestock for the available grains which accounts for 70-85% cost of poultry production (Sanni and Ogundipe, 2005), this trend has account for low protein intake as a result of high cost of feeds (Oyawoye,1999). Food and agricultural organization of the united nation (FAO, 1993) recommended 35g as the daily animal protein requirement for human being, but an average Nigerian consumes 3.24g animal protein per day. It is obvious therefore that any effort targeted at reducing the cost of feeding will be one of the possible remedies , therefore there is the need to find alternative protein sources in livestock feeding, Poultry production has been identified as one major means of solving problem of low protein intake in Nigeria (Maidala and Istifanus, 2012). However, feeding poultry presents a great challenge to farmers and nutritionists in Nigeria (Etuk *et al.,* 2012) and several tropical countries. Farmers and feed millers more frequently used the conventional feed ingredients (like fullfat soybean and groundnut cake) in producing their feeds. Unfortunately, these feed ingredients have become scarce and oftentimes unavailable. These, cost can be reduced by accommodating unconventional feed ingredients that have comparative nutrient potentials like the conventional ingredients such as bambaranut (Maidala *et al.,* 2011: Ani *et al.,* 2012), African locust bean (Obun, 2007: Ari *et al.*, 2012) and some of this unconventional protein sources proved promising in replacing conventional ones. It is against this background this study is design to test the performance of broilers chickens fed different plant protein sources as affected by processing.

Materials and Methods

The study wasconducted at the small animal laboratory of School of undergraduate, College of Education Azare, Bauchi State. Azare is located between latitude 11°15' and 11°30'N and longitude 10°10E and 10°30'E. The area is characterized by five (5) months of rainy season (April-September) and seven (7) months of dry season (October-march) (Bura, 2000). Two hundred and fifty day old Anak 2000 unsex day old broiler chicks were randomly allotted to four dietary treatments replicated five times in a completely randomized block design (CRBD).

Experimental Diets

Four experimental diets were formulated to include cooked soybean, African locust bean, and bambaranut and groundnut cake diet serving as control. The experimental diets were isocaloric and isonitrogenous. Birds were provided with water and feed *ad libitum*. The parameters determined were daily feed intake and daily weight gain while feed conversion ratio and feed efficiency ratio were computed from the weight gain and feed intake values. The data generated were subjected to analysis of variance (ANOVA) in a completely randomized block design (CRBD) (Steel and Torrie, 1980). Significant differences were separated using Duncan's multiple range

tests (Duncan, 1955).

Results and Discussion

The percentage compositions of the experimental diets are shown in Table 1 and 2 starter and finisher phases respectively. The crude protein, metabolisable energy and other nutrients met the requirements of broiler chickens in the tropics (Olomu, 1995). The diets were formulated in consonance with the established recommendation for dietary energy and protein in broiler chicken raised in warm wet climates (Oluyemi and Roberts, 2000; Obioha, 1992; Olomu, 1995) and met the crude protein and energy requirement of broilers in the tropics. The reduced feed cost (N/kg) in GNC-based (N77.76) diet could be attributed to the lower feed intake in GNC-based diet. Total feed cost is highest in soya-bean based diet (N379.30). The highest body weight (4.53kg) is in soya bean-based diet. The feed cost per kg gain is highest in GNC- based diet (N158.34) and lowest in soya bean based diet (N 126.43) diet. Therefore the soya bean-based diet was the least cost diet.

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Table 1: Ingredients and nutrient composition (%) of differently protein so urces fed to broiler chickens at the starter phase (1-5 weeks)

Ingredients	Diets			
	1 GNC	2 Soya bean (Cooked)	3 Locust bean (Salt treated)	4 Bambaranut (Sprouted)
Maize	52.05	45.06	37.52	46.32
Soya bean	-	36.04	17.43	6.95
Bambaranut	-	-	-	27.82
Locust bean	-	-	26.15	-
Groundnut cake	29.05	-	-	-
Wheat offal	10.00	10.00	10.00	10.00
Fishmeal	5.00	5.00	5.00	5.00
Limestone	1.00	1.00	1.00	1.00
Bone meal	2.00	2.00	2.00	2.00
Sodium chloride	0.25	0.25	0.25	0.25
Lysine	0.20	0.20	0.20	0.20
Methionine	0.20	0.20	0.20	0.20
Vitamin/mineral premix *	0.25	0.25	0.25	0.25
Total	**100.00**	**100.00**	**100.00**	**100.00**
Calculated analysis				
Crude protein %	23.00	23.00	23.00	23.00
Metabolisable energykcal/kg	2790.00	2800.00	2800.00	2800.00
Ether extract %	6.80	10.84	7.19	5.66
Crude fibre %	3.57	4.08	5.25	5.07
Calcium %	0.90	0.92	0.92	0.92
Available phosphorus %	1.2	1.2	1.2	1.2

* Each kilogram contains; vit. A, 10,000,000 IU, vit. D $_3$ 2,000,000 IU, Vit. E 23,000mg, Vit. K $_3$ 2.000mg, Vit, B $_1$ 1,800mg, Panthothenic Acid 7,500mg, Vit. B $_6$ 3,000mg, Vit. B $_{12}$ 15mg, Folic ac id 750mg, Biotin 11260mg,Choline Chloride 300,000mg, Cobalt 200mg, Copper 3,000mg, Iodine 1,000mg, iron 20,000mg, Manganese 40,000mg, Selenium 200mg, Zinc 30,000mg,Antioxidant 1,250mg

Table 2 Ingredients and nutrient composition (%) of broiler finisher di ets containing different protein sources

Ingredients	Diets			
	1 GNC	2 Soya bean (Cooked)	3 Locust bean (Salt treated)	4 Bambaranut (Sprouted)
Maize	54.06	45.06	50.00	44.00
Soya bean	-	31.04	6.75	6.28
Bambaranut	-	-		25.82
Locust bean	-	-	20.25	-
Groundnut cake	23.03	-		-
Wheat offal	15.00	15.00	15.00	15.00
Fishmeal	5.00	5.00	5.00	5.00
Limestone	1.00	1.00	1.00	1.00
Bone meal	2.00	2.00	2.00	2.00
Sodium chloride	0.25	0.25	0.25	0.25
Lysine	0.20	0.20	0.20	0.20
Methionine	0.20	0.20	0.20	0.20
Vitamin/mineral premix *	0.25	0.25	0.25	0.25
Total	**100.00**	**100.00**	**100.00**	**100.00**
Calculated analysis				
Crude protein %	21.00	21.00	21.00	21.00
Metabolisable energy kcal/kg	3000.00	3000.00	3000.00	3000.00
Ether extract %	5.65	8.44	8.71	5.95
Crude fibre %	5.06	5.49	6.2	6.10
Calcium %	1.32	1.32	1.40	1.40
Available phosphorus %	1.2	1.2	1.2	1.2

Each kilogram contains Vit A 3600, 000 IU. Vit. D 3 600.000 IU. Vit E 4.000.000mg. Vit B 1-B_6 640, 1600, 600, 4.00mg. Panthothenic acid 2000mg, Biotin 300mg. Manganese 16000mg. Manganese 16000mg. Selenium80mg. Vit. K 3 600mg. Cobalt 80mg. Copper1200mg. Zinc 12,000mg. Folic acid 200mg. Choline chloride700000mg. Antioxidant 500mg.

Table 3: Economics of production of broiler chickens fed different protein sources

Parameters	Diets			
	1 GNC	2 Soya bean (Cooked)	3 ALBS (Salt-treated)	4 Bambaranut (Sprouted)
Initial weight (g)	98.62	97.15	99.25	99.78
Final weight (g)	1610.00	1965.00	1747.00	1702.00
Total feed intake (kg)	3.93	4.53	4.50	4.41
Feed cost (₦/kg)	77.76	83.73	80.73	84.63
Total feed cost (₦)	305.60	379.30	363.29	372.22
Total weight gain (kg)	1.93	3.00	2.69	2.80
Feed cost (₦/kg) gain	158.34	126.43	135.05	133.29

*Based on prevailing market price