BAP -05

Response of Broiler Finisher Chickens to Diets Containing Differently Processed African Locust Bean Seeds

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Abstract

An experiment was conducted to evaluate the performance of finisher broilers fed diets containing differently processed African locust bean seeds (ALBS). Five diets were formulated such that diets T1, T2, T3, T4 and T5 contained raw, sprouted, salt treated, cooked and roasted ALBS. Two hundred and fifty (250) Anak 2000 Broiler chicks were randomly allotted to five dietary treatments replicated five times in a randomized completely block design. Results showed that daily feed intake (98.91-108.12g), daily weight gain (24.75-43.24g) and feed conversion ratio (2.34-3.61)were affected by the different processing methods ($p<0.05$). It can be concluded that salt treated ALBS enhanced feed intake, daily weight gain, feed conversion ratio (FCR) and survivability of broiler chickens, it should be recommended to broiler farmers wishing to use African locus bean seeds.

Keywords: African locus bean seeds, broilers, different processing methods

Introduction

Feed is the most important input in a profitable poultry production. It accounts for 70-85% of total the cost of production (Sanni and Ogundipe, 2005). The increasing cost of the conventionally used protein sources for animal feeding is a challenge in many developing countries including Nigeria. The high costs of animal feedstuff particularly of protein origin tend to suggest that alternative protein sources are to be explored. There exist numerous species and varieties of plant protein sources that are yet to be exploited or under-utilized for livestock nutrition. One of this unconventional plant protein sources which have the potential for inclusion in animal feed is ALBS.

ALBS has a wide distribution ranging across the Sudan and Guinea Savannah ecological zones (Campbell-platt, 1980). The ALBS tree (*Parkiaspp*) is a perennial legume of the family favacea and sub-family mimosoidea. The ALBS tree is a leguminous plant which produces seed grain that is often cheaper and readily available in northern Nigeria. It grows in the savannah region of Nigeria, to the southern edge of zone (Campbell-platt, 1980). African locust bean seed is rich in protein and is used as a flavor intensifier for soups and stew (Dike and Odunfa, 2003). The crude protein content of the bean varies between 25 and 35 % CP. Crude protein of 28.20 and 30.40 % has been reported by Hassan and Umar (2005) for seeds with hulls and without hulls respectively. The dehulled seeds contain high amount of amino acids than undehulled seeds except in glycine, phenylalanine, proline and threonine (Hassan and Umar, 2005). Locust bean is exceptionally high in lysine and argenine but low in sulphur containing amino acids such as methionine and cystein (Bawa *et al.,* 2007). Like other tropical legumes locust been usage is limited by the presence of anti-nutritional factors (Kingsley, 1995). The presence of anti-nutritional factors has been associated with growth depression in many livestock species (Birk, 1998). Increasing the nutritional quantity of locust bean and other legumes can be achieved by different processing methods such as cooking, toasting, soaking etc. (Akande and Fabiyi, 2010).

In this study, an experiment was conducted to evaluate the performance of finisher broilers fed diets containing differently processed African locust bean seeds.

Materials and Methods

The experiment was conducted in Azare, Katagum local government area of Bauchi state. Katagum local government is situated on the northern part of Bauchi state, Nigeria. It is located between latitudes 11^0 42' and 11^0 40^0 and longitude 10^0 31' and 10^0 11'east (Anon, 2009). The cleaned raw ALBS were poured into a bed of alluvial sand in half drum and heating the sand to about 100^oC. Sufficient quantities of the ingredients to cover two third of the area of sand was placed on the sand. Stirring of the ingredients was done constantly until they were roasted for the duration of thirty minutes.The raw ALBS were sorted to ensure homogeneity of product and were cooked by bringing water in a half drum to boiling point and pouring the ingredients in the boiling water for

thirty minutes (30) to produce the cooked ALBS, they were then sun dried for 3-4 days and ground to produce the corresponding ALBS meals.Salt solution was prepared by adding 3% salt of total weight of sample, dissolved in water and soaked the ALBS for twenty four hours (24 hours) they are then sun dried for 3-4 days and stored in bags. Salt treated ALBS meals were produced by grinding the saltedALBS.

Sprouting of ALBS was done by soaking the seeds in water for 24 hours. The seeds were removed and germinated by spreading the seeds on jute bags and covered them with the same material and apply water on jute bags twice daily for three to four days until the seeds began to sprout. SproutedALBS were sun-dried and ground to produce the meals.Five diets were formulated such that diets T1, T2, T3, T4 and T5 contained raw, sprouted, salt treated, cooked and roasted ALBS respectively (Table 1). Two hundred and fifty (250) Anak 2000 Broiler chicks were randomly allotted to five dietary treatments replicated five times in a randomized completely block design, data were collected feed intake, FCR and feed efficiency.Data generated were analyzed using Analysis of variance techniques (Steel and Torrie, 1980) using the Minitab software and means were separated using Duncan's multiple range test.

Table 1: Ingredients and nutrient composition (%) of broiler finisher

	Diets				
	T1	T 2	T3	T4	T5
IngredientsRaw	Sprouted	Salted	Roasted	Cooked	
Maize	39.93	39.93	39.93	39.93	39.93
African locust bean seeds	29.42	29.42	29.42	29.42	29.42
Soybean (Full-fat)	6.75	6.75	6.75	6.75	6.75
Wheat offal	15.00	15.00	15.00	15.00	15.00
Fishmeal	5.00	5.00	5.00	5.00	5.00
Limestone	1.00	1.00	1.00	1.00	1.00
Bone meal	2.00	2.00	2.00	2.00	2.00
Sodium chloride	0.25	0.25	0.25	0.25	0.25
Lysine	0.20	0.20	0.20	0.20	0.20
Methionine	0.20	0.20	0.20	0.20	0.20
Vitamin/mineral premix*	0.25	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00	100.00
Calculated analysis (%)					
Crude protein	21.00	21.00	21.00	21.00	21.00
M. E (kcal/kg)	300.00	300.00	300.00	300.00	300.00
Crude fibre	5.07	5.07	5.07	5.07	5.07
Ether extract	8.97	8.97	8.97	8.97	8.97
Calcium	1.43	1.43	1.43	1.43	1.43
Available phosphorus	0.92	0.92	0.92	0.92	0.92

*Each kilogram contains Vit A 3600, 000iu. 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. Selenium 80mg. Vit. K_3 600mg. Cobalt 80mg. Copper 1200mg. Zinc 12,000mg. Folic acid 200mg. Choline chloride 700000mg. Antioxidant 500mg. ME= Metabolisable energy

Results and Discussion

The growth performance of broiler chickens fed diets containing differently processed African locust bean seeds (5-8 weeks) are presented in Table 2. The initial weight ranged between 693.00 g in raw ALBS to 1210.00 g in salt-treated ALBS and the values were affected by the dietary treatments ($p<0.05$). The final weight varied between 1720.00 g in raw ALBS to 2300.00 g in salt treated ALBS and the values were affected ($p<0.05$) by the different processing methods. Feed intake varied from 98.91g in raw African locust bean seeds to 108.12 g in the sprouted African locust bean seeds and the difference between the values were significant ($p<0.05$). The daily weight gain ranged between 24.75 g in raw African locust bean seeds and 43.24 g in roasted African locust bean seeds and the difference between the values were ($p<0.05$).

The feed conversion ratio varied from 2.34 in salt treated African locust bean seeds to 3.00 in raw locust bean seeds and the difference between the values were significant ($p<0.05$). The feed efficiency ratio followed

the same trend (0.25-0.42) and the difference between the values were statistically significant ($p<0.05$). The survivability of chickens fed African locust bean seeds ranged between 96-100 %.

Table 2: Performance of broiler chickens fed diets containing differently processed African locust bean at the finisher phase (5-8 weeks of age)

	Diets					
	Raw	Sprouted	Salted	Cooked	Roasted	SEM
Parameters	ALBS	ALBS	ALBS	ALBS	ALBS	
Initial weight (g/b)	693.00 ^{b}	1036.00 ^{a}	1210.00 ^{a}	810.04 ^{b}	1108.04 ^{a}	281*
Final weight (g/b)	1720^{b}	2100^{ab}	2140^{ab}	2300^{a}	2140^{a}	281*
Daily feed intake (g)	98.91^{b}	108.12^{a}	101.51^{a}	104.59^{a}	107.10^{a}	8.45*
Daily weight gain (g)	24.75^{c}	37.12^{a}	43.24^{a}	28.93^{b}	39.59^{a}	8.02*
Feed conversion ratio	3.00 ^{b}	2.91 ^{b}	2.34^{a}	3.61 ^{c}	2.70^{b}	0.22*
Feed efficiency	0.25^{b}	0.34^{a}	0.42^{a}	0.27^{ab}	0.37^{a}	0.10*
Survivability %	96	98	98	98	100	-

SEM= Standard error of means, means bearing different superscripts within the same row are statistically different ($p<0.05$), ALBS= African locust bean seeds.

The reduced final weight (1720.00 g) and feed intake in the finisher phase in raw ALBS (98.91g) can be attributed to ANFS associated with raw ALBS (Alabi *et al.,* 2005). The reduced feed intake in raw ALBS can be attributed to ANFS which is known to depress feed intake in broiler chickens. The high feed intake in sprouted ALBS (108.12 g) may be due to low soluble carbohydrates in the sprouted ALBS; birds are known to consume more feed to balance their energy requirements (NRC, 1994).

The daily weight gain followed the same trend with raw ALBS having the least values (24.75 g). Salt treated ALBS have the highest values of daily weight gain (43.24g) ($p<0.05$). The values of daily weight gain reported in this study are higher than those reported by Obun (2008) on fermented ALBS.

The feed conversion ratio (2.34) and feed efficiency ratio (0.42) are better than the other treatmentswith salt treated ALBS having the best values. The values of feed conversion ratio are in line (3.18-4.55) with reports of Tamburawa *et al*.(2017) on soaked and fermented ALBS. The mortality of birds were highest in raw ALBS (4.00%), attributed to the effects of anti-nutritional factors in the raw ALBS.

Conclusion

Based on this study, it can be concluded that salt treated ALBS enhanced feed intake, daily weight gain, feed conversion ratio and survivability of broiler chickens, it should be recommended to broiler farmers wishing to use ALBS.

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