EFFECTS OF DIFFERENT PROCESSING METHODS OF RAW BAOBAB (Adansonia digitata) SEED MEAL ON PRODUCTIVE PERFORMANCE OF BROILER CHICKENS

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ABSTRACT:
A 28-day feeding trial involving 360 four weeks old Anak broiler chicks was carried out to study the effects of different processing methods of raw baobab (*Adansonia digitata*) seed meal on productive performance of broiler chickens at finisher phase. The birds were grouped into six dietary treatments with 10% levels of inclusion of differently processed raw baobab seed meal (RBSM), in a completely randomized design. Feed and water were offered to birds *ad libitum*.. Result of productive performance shows significant differences ($p<0.05$) between treatments for all the parameters considered. Feed intake, final body weight improves with birds fed boiled baobab seed meal. 10% level of inclusion of BBSM gave better productive performance among the processing methods. This indicate that boiling can be a better method of processing raw baobab seeds to used in broiler finisher diet without negative effect on productive performance.

Key words: productive performance, processing methods, raw baobab seed, broiler finisher.

INTRODUCTION

Protein is a global index for measuring well being of a country. The basic sources of protein in Nigeria are the ruminant and the non-ruminant. The ruminant Animals production is seriously in dangerous stage due to insurgency in the north-east, cattle rustling in the north-west, thereby reducing the supply of protein sources, the next alternative is poultry sources which is affected by high feed cost. Hence the need to source for alternative but promising feedstuffs. One of such alternative is baobab (*Adansonia digitata)* seed. Baobab (*Adansonia digitata*), locally called **kuka** (Hausa) and **luru** (Yoruba), which is another non-conventional feed stuff that is readily available in Nigeria and under-utilized, but holds much agronomic potentials (Saulawa et al 2012).There is therefore, the need to assess the potentials of such crop as a feedstuff for poultry production. The use of legumes as a component of poultry feed has been limited by the content of anti-nutritional factors (ANF). Saulawa et *al* (2012) and Saulawa et al (2014) reported that the inclusion of above 10% raw Baobab seed meal as plant proteins in diets of broilers leads to a significant impairment of growth and other undesirable physiological and biochemical alterations. This they attributed to the presence of toxic factors and ANF in legume seeds. Many efforts have been made to detoxify ANF through the application of heat and other processes but only a few permanent breakthroughs have been made. It was against this back drop that, this study was embarked up on to study the effect of different processing methods on raw baobab (*adansonia digitata*) seeds as an alternative plant protein source in broilers.

MATERIALS AND METHODS

This experiment was conducted at the poultry unit of the Teaching and Research Farm of Abia State University, Umudike Campus. Raw baobab seeds (RBS) were collected from katsina market in Katsina state, Nigeria

Processing of baobab seeds: The raw seeds of Baobab were collected from Katsina , Katsina State of Nigeria. The seeds were divided into five parts and processed. Processing was carried-out according to the recommendation of Abdu (2012) and Ukachukwu (2000) for *Mucuna cochinchinensis and Baobab respectively,* as follows:

a) Boiling: Boiling lasted for 60 minutes with change of water at 20 minutes interval.

b) Toasting: Toasting lasted for 60 minutes. Seeds were toasted in sand (placed inside a frying pan) at temperatures that fluctuate between 105 and 110^0C.

c) Soaking: Soaking lasted for 24 hours; Seeds were poured inside plastic buckets. Thereafter,

water was added and allowed to stand for 24 hours without changes of water.

d) Soaking and boiling: Soaking lasted for 24 hours and water drained off using local basket as in (c). These soaked seeds were boiled for 1 hour as in (a) though without changes of water.

e) Sprouting: Sprouting was conducted according to Obizoba and Amaechi (1983).They recommended 6 days of fermentation of raw baobab seeds. Seeds were poured inside a jute bag and placed inside water. Water was changed daily until germination starts. All the processed seeds with the exception of raw and toasted seeds were oven dried at 60^0C before being milled for chemical Analysis and feed compounding based on formulation.

Experimental procedure

Four hundred (400) day-old Anak broilers were housed and brood in a deep litter brooding room. Brooding lasted for four weeks.At the end of the fourth week (brooding period) Three hundred and sixty (360) Birds were housed in 18 pens measuring 3x3m2 and they were allotted to six (6) experimental diets and replicated three times in a completely randomized experimental design, Diet one was soybeans based (control) diet, while 10% processed raw Baobab seeds (Boiled, Soaked, Soaked and Boiled, Toasted and Sprouted) were used to quantitatively replace equivalent weight of soybeans meal in diets 2, 3, 4, 5, and 6 respectively in a completely randomized design. The birds were randomly assigned to these diets. Feed and water was given *ad-libitum* throughout the experimental period. This experiment lasted for 28 days (4^{th}-8^{th} weeks of age). Feed intake was determined daily and weight gain was determined weekly. Data on productive performance were obtained and subjected to statistical analysis.

Experimental diets: table 1 shows composition of the experimental diets containing same (10%) level of inclusion of differently processed test ingredients. 10% level of inclusion was chosen based on the recommendation of saulawa et al (2012) who recommended 10% level of inclusion of RBSM on broiler diet without negative.

RESULT AND DISCUSSION

The productive performance of broiler birds fed both soybean based (control) diet and diets containing 10% of differently processed baobab seed meal at finisher phase is shown in Table 2. There were significant ($P<0.05$) differences in all the parameters considered with the exception of percentage mortality. In all the parameters considered there were no significant ($P>0.05$) differences between the control diet and boiled baobab seed based diet except in feed intake. Daily Feed intake was highest in birds fed boiled baobab (137.55g/bird) based diet (D2) followed by D_6 (136.96g/b), D_4 (135.38g/b), and D_1 (134.46g/b) which were themselves similar while D5 was the lowest. The higher daily feed intake value of 137.55g/b for D_2 (Boiled) over the control diet and other treatments could be attributed to low availability of the energy of the diet, and hence uptake of more of the diet to balance for energy, as chickens are known to meet their energy requirements (Emenalom and Udedibie 1998). The poor feed intake of birds fed diet 5 (Toasted) could be attributed to the inability of the processing method to detoxify the anti-nutrient present in the test ingredient to a tolerable level. The weight-gain as shown in Table 2 Indicated significant differences ($P<0.05$). Treatments D_1 (control) had similar weight gain with D_2 (Boiled), but , higher ($p<0.05$) than the values for D_3,D_4 and D_6, while D_5 had the lowest weight gain, Ukachukwu (2000) attributed this to the fact that body weight gain is a function of feed intake, management and other factors. The better performance of the birds placed on boiled baobab seeds over other treatments may be attributed to better detoxification of anti-nutrients and hence availability of proteins and their constituent amino acids, leading to better weight gain by birds placed on boiled seeds, This finding is in agreement with the findings of Amaefule *et al* (2003) who reported better weight gain on birds fed boiled pigeon pea and mucuna respectively. Significant differences ($P<0.05$) were observed in gross margin among treatment means. with birds fed boiled baobab seed meal diet having the highest value (N121.08), followed by D_1 (control), then those of D_4 and D_6 while that of D_5 was the lowest ($p<0.05$). This may be the product of favorable weight gain and moderate feed cost fed diet containing 10% boiled baobab seed meal. Based on final live weight, weight gain, feed conversion and gross margin values Diet 2 (boiled Baobab) compared favourably with the control diet in growth performance. This is in agreement with Abeke *et al* (2007) who reported better performance in broilers fed boiled *Lablab purpureus* beans. The above results show that in

evaluating the different processing techniques, boiling (D_2) compared favourably with the control diet hence, boiling is recommended as a good processing technique. Further more the result of body weight gain, FCR, PER, Feed intake and gross margin among the processing methods birds fed boiled baobab seed meal at 10% level of inclusion at the finisher phase gave the best result as it favourably compared with the control diet

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Table 2: Performance of broiler chickens fed differently processed baobab seed meal diet at finisher phase.

	Diets					
	(D1) CONTROL	(D2) BBSM	(D3) SBSM	(D4) SBBSM	(D5) TBSM	(D6) SPBSM
Initial body weight(g)	588.46	581	588	579.68	586.06	588.11
Final body weight (g)	1873.33^{a}	1738.66^{ab}	1638.36^{b}	1601.32^{b}	1381.17^{c}	1591.00b
Daily weight Gain(g)	45.89^{a}	37.77^{ab}	37.51^{b}	36.48^{b}	28.40^{c}	35.82b
Daily feed Intake(g/b)	134.46^{b}	137.55^{a}	129.92^{d}	135.38^{bc}	126.44^{e}	136.96b
FCR	2.93^{c}	3.64^{b}	3.46^{b}	3.71^{b}	4.45^{a}	3.82b
PER	1.72^{a}	1.40^{ab}	1.32^{ab}	1.37^{ab}	1.00^{b}	1.38ab
Mortality(%)	0	0	0	0	0	0
Gross margin (N)	105.32^{b}	121.08^{a}	96.00^{d}	98.78^{c}	90.73^{e}	101.04c

a,b,c,d,e Treatment means with different superscripts are significantly($p<0.05$)different from each other ; SEM : Standard error of the means . RBSM raw baobab seed meal, TBSM : toasted baobab seed meal, BBSM boiled baobab seed meal, SBSM: Soaked baobab seed meal, SBBSM: Soaked and boiled baobab seed meal: SPBSM; Sprouted baobab seed meal

Table 1: Composition of experimental diets containing same levels of differently processed Baobab seed meal fed at finisher phase.

Ingredients	DIETS					
	Control (D1)	BBSM (D2)	SBSM (D3)	SBBSM (D4)	TBSM (D5)	SPBSM (D6)
Maize	54.00	54.00	54.00	54.00	54.00	54.00
Soyabeans	22.30	11.30	11.30	11.30	11.30	11.30
BSM	00.00	10.00	10.00	10.00	10.00	10.00
Bloodmeal	1.00	1.00	1.00	1.00	1.00	1.00
Palm Kernel Cake	14.00	14.00	14.00	14.00	14.00	14.00
Fishmeal	3.00	3.00	3.00	3.00	3.00	3.00
Bonemeal	3.00	3.00	3.00	3.00	3.00	3.00
Oystershell	2.00	2.00	2.00	2.00	2.00	2.00
Vit premix*	0.25	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25	0.25
Methionine	0.10	0.10	0.10	0.10	0.10	0.10
Lysine	0.10	0.10	0.10	0.10	0.10	0.10
TOTAL	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Determined composition (%)						
Crude protein	19.89	19.86	19.87	19.78	19.62	19.75
Ether Extract	4.89	1.43	1.48	1.49	1.63	1.21
Crude Fiber	4.01	6.58	6.67	6.69	6.45	6.93
Ash	12.41	8.60	8.64	8.41	8.00	8.87
NFE	56.28	50.54	51.34	52.21	53.30	51.46
Dry matter	90.40	87.01	88.00	88.17	89.00	88.22
Calculated composition (%)						
Crude protein	20.72	19.16	19.96	19.91	19.71	19.97
M.E(Kcal/Kg)	2910.60	2857.00	2808.18	2841.13	2881.00	2827.03

*1kg of premix contains : Vitamins A (5,000,000 I.U), Vitamin D3 (1000000 I.U),Vitamin E (16000mg), Vitamin K3 (800mg), Vitamin B1 (1200mg), Vitamin B2 (22000mg),Niacin(22000mg), Calcium pontothenate (4600mg),Vitamin B6 (200mg),Vitamin B12 (10mg), Folic acid (400mg), Biotin (32mg), Choline chloride (200000mg), Manganese (948000mg), Iron (40000mg), Zinc (32000mg), Copper(3400mg), Iodine (600mg), Cobalt (120mg), selenium (48mg), Anti-Oxidant (48000mg). RBSM: raw baobab seed meal, TBSM: toasted baobab seed meal, BBSM: boiled baobab seed meal, SBSM: Soaked baobab seed meal, SBBSM: Soaked and boiled baobab seed meal: SPBSM: Sprouted baobab seed meal, ME: Metabolisable energy.