33(

EFFECT OF FEEDING COOKED FLAMBOYANT (*Delonix regia*) SEED MEAL ON GROWTH PERFORMANCE OF BROILERS

Y.S. KUDU., A. USMAN., S.S.A EGENA., J.O. ALABI., B.M. MUHAMMED AND G. TAUHID
Department of Animal Production, federal University of Technology, Minna, Niger State.
**Corresponding author: essa_may25@yahoo.com*

SUMMARY
This study was designed to examine the effect of replacing groundnut cake (GNC) in the diet of broilers with graded levels of cooked Flamboyant seed meal (CFSM) as a protein source. The experimental diets were designated at T_1, T_2, T_3 and T_4 representing 0%, 10%, 15% and 20% level of inclusion of CFSM respectively. One hundred and twenty day-old Hubbard broiler chicks were used for the experiment. The chicks were divided into four treatment groups each with three replicates. Parameters measured include body weight, body weight gain, feed intake, feed conversion ratio (FCR) and nutrient digestibility. Results showed no significant ($p>0.05$) difference across the treatments at the starter phase for all the parameters evaluated except for feed intake, body weight and nutrient digestibility. At the finisher phase, there were significant ($p<0.05$) differences observed in feed consumption, body weight gain, feed efficiency and nutrient digestibility coefficients among the treatments. It was concluded that broilers can tolerate CFSM up to 20% level of inclusion without any adverse effect on their performance.

INTRODUCTION
The high cost of animal feedstuff particularly protein tends to suggest that alternative plant protein sources e sought for poultry feed. The conventional protein feedstuffs are continuously been competed for by man in attempt to meet up their protein requirements, thus have influenced extraneous increases in cost of the conventional plant protein sources particularly and Soyabean. Due to the high cost of feeding ingredients, it was recently observed that commercial feed operators have compromised on standards (Kudu *et al.*, 2008) such that, the composition labels on branded bags does not truly reflect the actual nutrient composition of the feed. Where such feed was used in Cockerels, performance in terms of growth rate was reduced (Kudu, *et al.*, 2008). To meet the plant protein demand of livestock, nutritionists are seeking plant protein alternatives (usually referred to as non-conventional feedstuff) in order to ameliorate the high cost of feeding. Some of the recently conducted researches revealed that Pigeon pea (Karsin *et al.*, 2008), *Afzelia Africana* (Obun and Ayanwale, 2008), Flamboyant seeds (Egena *et al.*, 2007; Shiawoya *et al.*, 2008), Taro Cocoyam (Edache *et al.*, 2008), bitter Kola (Asiegwu *et al.*, 2008), Bambara groundnut (Omoikhoje et al., 2008) and a host of others have been successfully used as a protein source in livestock nutrition particularly monogatrics.

Flamboyant seed have been shown to be a good source of protein particularly when processed (Egena *et al.*, 2007; Shiawoya *et al.*, 2008). Processing tends to impact or improve the nutritional values of protein seeds with particular reference to crude protein and anti-nutritional factors (trypsin inhibitor, tannin, phytic acid) which often limits the use of most legume seeds. The purpose of this research is to investigate the effect of cooking Flamboyant seed on the performance of broilers.

MATERIALS AND METHODS
The study was conducted in the poultry unit of the Department of Animal Production, Federal University of Technology, Minna, Niger State between July and August, 2008. Maize bran, maize grain, fish meal, salt, premix, bone meal, limestone, GNC, methionine and lysine were obtained within Minna. The test ingredient (Flamboyant seeds) was sourced from within Minna and its environment. The seeds were sun-dried, and boiled at temperature of 105-110^{0}C until the seeds became soft. The boiled seeds were sun-dried and milled using a hammer milled and stored until needed as cooked Flamboyant seed meal (CFSM). The meal was used to formulate four experimental diets (Table 1). One hundred and twenty day-old Hubbard broiler birds were randomly allotted to four treatments each with three replicates of 10 birds in a completely randomized design. Warmth was provided using 200 watt electric bulbs. Feed and water was supplied *ad libitum* throughout the trial. Other routine management practices were observed and vaccine administered as of when due. A digestibility trial was carried out to assess the metabolic response of the birds to the experimental diets. Feed and faces were analyzed using the method of AOAC (1990). A modified method of AOAC (1984) was used to analyze for tannin and trypsin inhibitor, while phytic acid level was analyzed using the method of Latta and Eskin (1984). All data collected were subjected to analysis of variance according to Snedecor and Cochran (1980) and means separated using Duncan multiple range test as outlined by Steel and Torrie (1980).

RESULTS AND DISCUSSION
The proximate composition of the test ingredient is shown in Table 2. it revealed that through cooking, the entire nutrients contained in uncooked Flamboyant seed (UCFSM) were increased particularly crude protein (CP), dry matter (DM),

crude fibre (CF), ether extract (EE) and ash. However, reduction in Nitrogen free extract (NFE) and moisture content was observed following cooking. Egena *et al.* (2007)and Shiawoya *et al.* (2008) both reported similar increase in CP, CF and EE when Flamboyant seeds were roasted and anaerobically fermented followed by lyle treatment. Therefore the relative increase observed in the said parameters is reflective of the influence of cooking on the test ingredient. The observed increase in EE reflects the fact that cooking has a positive effect on the crude fat of the seed. This is in agreement with Okigbo (1975).

Table 3 shows the effect of cooking on anti-nutritional factors. Trypsin inhibitor and tannin were greatly reduced as much as by 66.30 and 66.55% respectively. Egena *et al.* (2007) noted reduction in anti-nutritional factors when Flamboyant seeds were anaerobically fermented and lyle treated. Similar observation was reported by Shiawoya *et al.* (2008) when Flamboyant seeds were roasted. Karsin *et al.* (2008) noted that cooking improves the nutritional value of Pigeon pea. Table 4 shows the performance of broilers fed graded levels of cooked Flamboyant seed meal. At the starter phase, significant difference ($p<0.05$) was observed in body weight and feed intake. The body weight of the birds fed UCFSM was observed to be lower than those fed the test ingredient. Birds fed T_2 (10% CFSM) had the least body weight amongst those fed the test ingredient. At the finisher phase, body weight, body weight gain, feed intake and feed conversion ratio were all significantly ($p<0.05$) affected. Feed intake decreased progressively as the inclusion level of CFSM increased in the diet. This is at variance with the report of Egena *et al.* (2007) and Shiawoya *et al.* (2008) who all observed remarkable increase in feed intake with increasing level of Flamboyant seed meal inclusion in the diet. Although birds fed the control diet had higher consumption, this did not translate to the final body weight as birds fed the test ingredient had better ($p<0.05$) final body weight. Obun and Ayanwale (2008), Egena *et al.* (2007) and Karsin *et al.* (2008) reported that processing of legumes tend to have a positive influence on broilers.

Table 5 shows the nutrient digestibility by broilers fed graded levels of CFSM. Most of the nutrients seem to be well digested at both phases of the experiment. Age seem not to have affected the birds ability to digest nutrients at the starter phase as reported in roasted Flamboyant seed meal (Shiawoya *et al.*, 2008) or at the finisher phase for that matter. Cooking therefore did not hamper the bird's ability to digest nutrients in the seed meal. This might be linked to the reduced level of anti-nutrients in the cooked Flamboyant seed meal (Table 3).

CONCLUSION

From the findings of this study, it can be concluded that broilers can tolerate CFSM as a substitute to GNC up to 20% level of inclusion without any deleterious effect.

ACKNOWLEDGEMENT

The authors wish to acknowledge the permission of the Federal University of Technology, Minna for allowing them access to the farm facilities and laboratory to conduct this research.

REFERENCES

AOAC (1984). Official method of analysis of the Association of Official Analytical Chemists. 14th edition. Washington DC.

AOAC (1990). Official method of analysis of the Association of Official Analytical Chemists. 15th edition. Washington DC.

Edache, J.A., Musa, U., Karsin, P.D., Esuonu, J.O., Yisa, A., Okpara, E.j. and Zwandor, N.J. (2008). Nutritional evaluation of graded levels of Taro cocoyam in the diet of Quail (*Coturnix coturnic japonica*) chicks. *Proc.33rd Ann. Conf. NSAP.* Ayetoro, Ogun State. 18th-20th March. Pp:385-389.

Egena, S.S.A., Yahaya, S.K., Shiawoya, E.L. and Usman, A. (2007). Effect of anaerobic fermentation/lyle treatment and roasting of Flamboyant seed on nutrient digestibility and carcass characteristics of broilers. *Int.J. of Trop. Agric. And Food System (4)*:373-374.

Esiegwu, H.O., Obikaonu, A.B.I. and Esonu, B.O. (2008). Effects of dietary bitter Kola (*Garcinia kola*) on performance of broilers. *Proc.33rd Ann Conf. NSAP.* Ayetoro, Ogun State. 18th-20th March. Pp:393-395.

Karsin, P.D., Oyawoye, E.O., Bawa, G.S., Musa, U. and Edache, J.A. (2008). Performance of Japanese quails fed graded levels of Pigeon pea (*Cajanus cajan*) meal. *Proc.33rd Ann. Conf. NSAP.* Ayetoro, Ogun State. 18th-20th March. Pp:390-392.

Kudu, Y.S., Alabi, J.O., Egena, S.S.A. and Umaru, M.A. (2008). Effect of four different commercial feeds on Cockerel production. *Proc.33rd Ann. Conf. NSAP.* Ayetoro, Ogun State. 18th-20th March. Pp:443-445.

Latta, M. and Eskin, M. (1984). Simple calometric method of phytate determination. *J.Agric. and Food Chem. 28*:1313-1315.

Obun, C.O. and Ayanwale, B.A. (2008). Performance, nutrient digestibility and cost evaluation of raw and roasted *Afzelia Africana* seed meal fed to finisher broiler chicks. *Nig. J. of Anim. Prod. 35*:9-17.

Okigbo, B.W. (1975). Neglected plants of horticultural farming system of tropical Africa. *Acta Horticulture 53*:131-151.

Omoikhoje, S.O., Bamgbose, A.M., Aruna, M.B., Obasoyo, D.O. and Ehebha, E.T.E. (2008). Proximate and mineral composition of Bambara groundnut as influenced by cooking periods. *Proc.33rd Ann. Conf. NSAP.* Ayetoro, Ogun State. 18th-20th March. Pp:459-461.

Shiawoya, E.L., Yahaya, S.K., Egena, S.S.A. and Usman, A. (2008). Performance of broilers fed graded levels of roasted Flamboyant (*Delonix regia*) seed meal. *Proc.33rd Ann. Conf. NSAP.* Ayetoro, Ogun State. 18th-20th March. Pp:439-442.

Snedecor, G.W. and Cochran, W.G. (1980). Statistical methods. 7th edition. Iowa State University Press Ames, Iowa, USA.

Steel, R.G.D. and Torrie, J.H. (1980). Principles and procedures of statistic. A biometrical approach. 2nd edition. McGraw Hill.

Table 1:composition of experimental diets

Ingredient	Starter phase				Finisher phase			
	T_1	T_2	T_3	T_4	T_1	T_2	T_3	T_4
Maize	56.17	56.17	56.17	56.17	57.79	57.79	57.79	57.79
GNC	32.82	29.54	27.9	26.26	25.96	23.26	22.07	20.17
CFSM	0.00	3.28	4.92	6.56	0.00	2.59	3.89	5.19
Fish meal	2.50	4.00	3.00	3.00	5.00	4.50	4.00	4.00
Maize bran	5.00	2.50	2.50	1.50	7.85	7.46	6.85	6.85
Bone meal	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CaCo3	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Red oil	1.00	2.00	3.00	4.00	1.00	2.00	3.00	3.00
Salt	0.10	0.10	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	0.10	0.10
Methionine	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Premix	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CP%	22.00	22.00	22.00	22.00	20.00	20.00	20.00	20.00
Energy(Kcal/Kg)	3016.00	3006.00	3017.00	3036.00	2935.99	2921.73	2904.11	2903.79

Table 2: Proximate composition of the test ingredient (%)

Parameter	UFSM	CFSM
DM	87.80	94.00
Moisture	12.20	6.00
CP	18.10	25.00
CF	7.50	12.50
EE	7.50	10.05
Ash	3.60	6.00
NFE	51.10	40.45

Table 3: Effect of cooking on anti-nutrients of Flamboyant seed

Parameters	UFSM	CFSM	% reduction
Phytate (mg/100g)	2.13	1.01	52.58
Tannin (g/kg)	93.10	33.00	66.55
Trypsin inhibitor (Tui/mg)	273.00	92.00	66.30
Saponin (%)	12.23	6.31	48.01

Table 4: Performance of broilers fed CFSM

	T1	T2	T3	T4	SEM
Starter phase					
Initial body weight (g)	61.20	61.70	61.50	61.50	
Body weight (g)	406.50^{a}	408.00^{a}	422.00^{b}	431.00^{c}	10.15*
Body weight gain (g/week)	31.57	30.71	31.00	30.43	0.42ns
Feed intake (g)	3226.66^{d}	3160.00^{c}	3081.67^{a}	3108.33^{b}	55.33*
FCR	14.66	14.7	14.34	14.53	0.14ns
Finisher phase					
Body weight	1523.18^{a}	1649.58^{d}	1559.50^{b}	1672.50^{c}	61.75*
Body weight gain (g/week)	56.25^{a}	56.52^{b}	63.42^{c}	69.39^{d}	5.44*
Feed intake (g)	6000.00^{c}	5955.00^{a}	5980.00^{b}	5955.04^{a}	18.87*
FCR	15.24^{c}	13.28^{a}	13.66^{b}	13.68^{b}	3.00*

a,b,c: means denoted by different superscript along the same row are significantly different ($p<0.05$)

	T_1	T_2	T_3	T_4	SEM
Starter phase					
DM	96.38^{d}	92.00^{a}	95.81^{c}	95.64^{b}	0.65*
CP	81.63^{b}	78.17^{a}	85.96^{d}	84.86^{c}	1.14*
CF	69.80^{c}	61.93^{a}	65.95^{b}	74.47^{d}	1.74*
EE	95.04^{c}	93.99^{b}	96.31^{d}	92.61^{a}	0.51*
Ash	79.88^{c}	78.41^{a}	91.68^{d}	79.32^{b}	2.05*
NFE	93.25^{a}	94.27^{b}	94.37^{c}	95.65^{d}	0.32*
Finisher phase					
DM	67.64^{a}	97.90^{d}	97.14^{c}	96.84^{b}	4.86*
CP	90.41^{d}	89.08^{c}	88.02^{b}	87.20^{a}	0.45*
CF	94.50^{c}	87.59^{a}	92.41^{b}	92.18^{b}	0.95*
EE	97.34^{c}	96.77^{b}	97.45^{c}	96.01^{a}	0.21*
Ash	84.09^{a}	84.24^{a}	89.44^{b}	90.02^{c}	0.97*
NFE	91.77^{d}	91.53^{c}	90.80^{a}	91.07^{b}	0.14*

a,b,c: means denoted by different superscript along the same row are significantly different ($p<0.05$)