INFLUENCE OF GRADED LEVELS OF *ETANDA AFRICANA* SEED MEAL ON GROWTH PERFORMANCE OF BROILER CHICKENS

Ajibade, A. J^, *Makinde, O.J+> Adedeji, A.S^, Adetona, A^, Sulyman A^, Opoola, E#, Sikiru, A. B< and Okunade, S. A^

^ Federal College of Wildlife Management, New Bussa, Nigeria

+ Department of Animal Science, Federal University, Gashua, Nigeria

Department of Animal Science, Ahmadu Bello University, Zaria, Nigeria.

<Department of Animal Production, Federal University of Technology, Minna.

>Universite de Kisangani, Faculte des Sciences, Department des Sciences Biotechnologues Laboratoire de Microbiologie et Phytopathologie B.P. 2012, R.D. Congo.

***Corresponding author:** johyinmak@yahoo.com*

ABSTRACT

This study was conducted to evaluate the effect of graded levels of processed *Etanda africana* seed meal (EASM) on growth performance of broiler chickens. Five experimental diets were formulated to meet nutrient requirement standards of broilers. Diet 1 (0 % EASM) served as the control while diets 2, 3, 4 and 5 contained 5, 10, 15 and 20 % EASM respectively. A total of one hundred and fifty (150) day-old broiler chicks were randomly allotted into five treatment groups with three replicates of ten birds each. Each group was assigned to the five experimental diets in completely randomized design (CRD). Throughout the experimental period, feed and water were provided *ad libitum* for all treatment groups. The results of growth performance revealed that average body weight gain, average feed intake and FCR were not statistically (P>0.05) influenced by dietary treatments. It was concluded that up to 20 % EASM could be included in the diets of broiler chickens without adverse effect on growth performance of the birds.

Keywords: *Etanda africana*, processing, boiling, roasting, broilers, performance

INTRODUCTION

Entada africana belongs to the family *Fabaceae* which is popularly known as legumes and it is the third largest order of seed-plants containing about 600 genera with 12,000 species (Sharma and Kumar, 2013). It is a small tree which is mostly found in tropical and subtropical regions (Nielsen, 1992). In Nigeria, it is commonly known as "Tawatsa" in Hausa Language and "Ogurobe" in Yoruba (Burkill, 1995). It can be used as food, medicine and fibre. Nutritionally, the seed of *Entada africana* was reported to contain 39.81 % crude protein, 80.00 % dry matter, 15.50 % crude fibre, 17.50 % ether extract, 4.88 kcal/kg metabolizable energy, 39.00 % acid detergent fibre and 53.00 % neutral detergent fibre (Belewu *et al.*, 2008). The authors further reported the mineral contents of the seeds to be 7.66 % calcium, 0.20 % sodium, 45.42 % magnesium, 44.92 % potassium and 0.17 % iron. Similarly, Olanrewaju and Ahmed (2014) reported that *Entada africana* leaves contain 4.20 % moisture content, 13.30 % ash, 10 %crude lipid, 18.56 % crude fibre, 14.60 % crude protein and 38.44 % carbohydrate. Previous study on the potential of *E. africana* in livestock feed revealed that the seed meal can replace soybean meal in the diet of growing West African Dwarf goats without impairing performance (Belewu *et al.*, 2007). There is however, dearth of information on its use in poultry nutrition. This present study evaluated the influence of graded levels of processed *Etanda africana* seed meal on growth performance of broiler chickens.

MATERIALS AND METHODS

The experimental was conducted at the Poultry unit of the Teaching and Research Farm, Federal College of Wildlife Management, New Bussa, Niger State previously described by Okunade *et al.* (2015). About 600 g of *Etanda africana* seeds were obtained from the College Farm. The seeds were handpicked so as to eliminate all unwanted particles. The seeds were then air-dried for 48 hr at 25°C and divided into 2 lots; (i) raw and (ii) boiled and roasted. About 300 g seeds were boiled at 100°C at a seed: water ratio of 1: 10 w/v. for 10 min in an aluminium pot on a Gallenkamp thermostat hot plate (Makinde *et al.*, 2019). The water was drained and the boiled seeds were air-dried at 25°C for 72 hr. The boiled seeds were further roasted in an open pan under the controlled temperature at 65°C for 15

minutes. The seeds were continuously stirred until the seeds cracked and their endosperm turned brown with toasty sweet odour. All the seed samples (raw and processed) were ground to pass through a 2 mm sieve and taken to the laboratory for nutrient and anti-nutrient analysis.

Experimental Design and Management of Birds

One hundred and fifty day old unsexed broiler chicks were purchased from a reputable hatchery in Ibadan, Nigeria. The birds were raised on deep litter pen with wood shaving as litter material. They were fed on a common diet for the first (1) week of the study after which they were randomly allocated into five experimental treatments of thirty birds per treatment, while each treatment was replicated three times (10birds per replicate) in a completely randomized design (CRD). Feed and water were supplied *ad-libitum.* Management practices and vaccination programme were followed strictly. Data were collected on average daily weight gain, average daily feed intake and feed conversion ratio.

Experimental diets

Five experimental diets were formulated to meet nutrient requirement standards of broilers (NRC, 1994). Diet 1 (0 % EASM) served as the control while diets 2, 3, 4 and 5 contained 5, 10, 15 and 20 % EASM respectively. The gross composition of the experimental diets is presented on Table 1.

Data Analysis

Data generated were subjected to Analysis of variance (ANOVA) using the general linear model of statistical analysis system, Version 9.3 (SAS, 2015). Significance was accepted at $P < 0.05$.

Table 1: Dietary composition of experimental starter and finisher diets

	Starter					Finisher				
Ingredients	**T1**	**T2**	**T3**	**T4**	**T5**	**T1**	**T2**	**T3**	**T4**	**T5**
Maize	56.00	53.00	51.00	50.00	48.50	59.50	58.50	54.50	51.00	48.50
Wheat offal	6.50	6.50	6.50	6.50	6.50	9.00	9.00	9.00	9.00	9.00
GNC	27.00	25.00	22.00	16.00	15.00	22.00	18.00	17.00	15.50	13.00
**EASM*	0.00	5.00	10.00	15.00	20.00	0.00	5.00	10.00	15.00	20.00
Fish meal	3.00	3.00	3.00	3.00	3.00	2.50	2.50	2.50	2.50	2.50
Blood meal	2.00	2.00	2.00	2.00	2.00	1.50	1.50	1.50	1.50	1.50
Bone meal	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Oyster shell	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Premix	0.25	0.25	0.25	0.25	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	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25	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	0.25	0.25	0.25	0.25
Total	100	100	100	100	100	100	100	100	100	100
Calculated nutrients										
CP (%)	22.95	22.90	22.87	22.80	22.76	20.86	20.75	20.71	20.64	20.58
Met. Energy (Kcal/kg)	2816	2811	2807	2805	2802	3024	3019	3015	3012	3005
CF (%)	3.56	3.62	3.74	3.75	3.77	3.95	3.99	4.05	4.09	4.11
Lysine (%)	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Methionine (%)	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48

*Composition of vitamin premix per kg is as follows: Vitamin A, 8000 iu; Vitamin D_3, 1600 iu; Vitamin E 5 iu, Vitamin K 0.200 mg; Vitamins B, Thiamine B_1 0.5mg; Riboflavin B_2 4mg; Pyridoxine B_6 0.015 mg; Niacin 0.015mg; B_{12} 0.01mg; Pantothenic acid 0.5mg; folic acid 0.5mg and Biotin 0.020 mg; Chlorine chloride 0.02 mg; Anti-oxidant 0.125g and Minerals (Mn, Zn, Fe, Cu, I, Si, Co) 0.156g.*EASM=*Etanda africana* seed meal. CP=Crude protein. CF=Crude fibre

RESULTS AND DISCUSSION

The results of the effect of graded levels of *Etanda africana* seed meal on growth performance of broiler chickens (1-7 weeks), is presented in figure 1. The results show that body weight gain, average feed intake and FCR were not significantly (P>0.05) influenced by the dietary treatments. The observations on feed intake, body weight gain and FCR of broiler chickens in this study showed that inclusion of EASM up to 20% in broilers diet had no adverse effect on growth performance of birds.

The overall growth performance of birds fed EASM diets were similar to those fed the control diet. The similarities observed in most of the performance evaluation traits implied that there was no intake limitation when EASM increased in the diets from 0 to 20% and there was acceptability and palatability as well as better utilization of the feed by the birds.

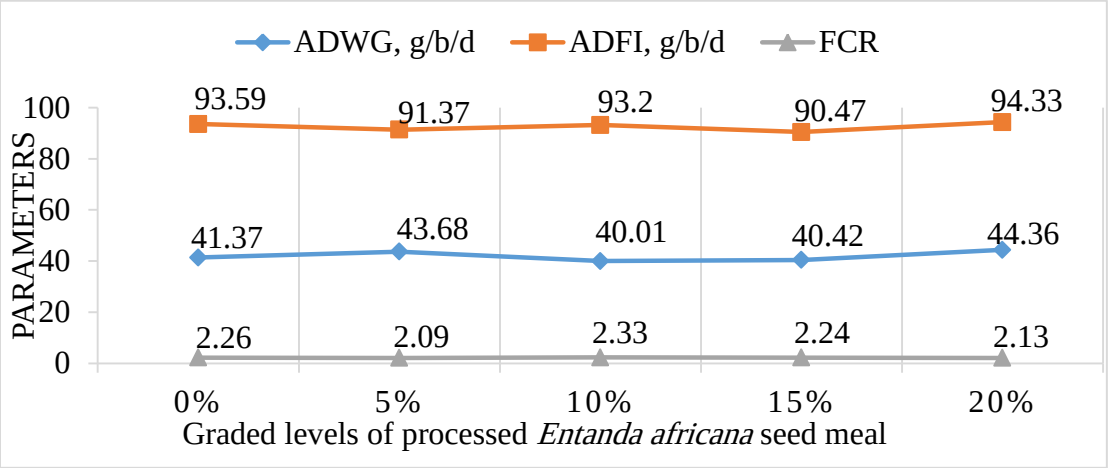

Figure 1: Growth performance of broilers fed processed *Entanda africana* seed meal (1-7 weeks)

This observation could be attributed to the reduction of anti-nutritional factors in the processed seed and the nutrient balance of the experimental diets at both the starter and finisher phases (Ari *et al.*, 2012). Our result confirms the assertion of Alagbaoso *et al.* (2015); Makinde *et al.* (2019) that heat treatment of seed is effective in reducing anti-nutritional factors inherent in most legumes. Also, Kanyinji and Sichangwa (2014) observed that there was no significant difference in the performance parameters (feed intake, body weight gain and FCR) of broilers fed finishing diets with processed cotton seed meal as partial replacement for soybean meal. Our results however differs from the report of Wafar (2013), who observed a significant difference in feed intake, body weight gain and FCR of broilers when toasted sorrel seed (*Hibiscus Sabdariffa)* meal as substitute for soybean meal increased to 20% in broilers diets. This variation may be attributed to the differences in the initial live weights, breed of broilers and nutrient content of seed and concentrates used for the study.

CONCLUSION AND RECOMMENDATIONS

It was concluded that up to 20 % EASM could be included in the diets of broiler chickens without adverse effect on growth performance of the birds. Further researches should be conducted to ascertain the optimum inclusion level of EASM in broilers diet.

ACKNOWLEDGEMENT

The authors gratefully acknowledge Haruna KL, Kamarudeen AT, Ishola AO, Sodiq, I and Ibrahim AA for their assistance in the collection of data pertaining to this study.

REFERENCES

Alagbaoso, S.O., Nwosu, J. N., Njoku, N.E., Umelo, M.C., Eluchie, C. and Agunwa, I. M. (2015). Effect of Processing on the Nutritional and anti-nutritional properties of *Canavalia Plagiosperma Piper* Seeds. *European Journal of Food Science and Technology*. 3(3):45-69.

Ari MM, Ayanwale BA, Adama TZ, Olatunji EA. (2012). Effects of Different Fermentation Methods on the Proximate Composition, Amino Acid Profile and Some Antinutritional Factors (ANFs) In Soyabeans (*Glycine Max*) Fermentation. *Technology and Bioengineering*, 2:6-13.

Belewu, M. A., Fagbemi, T., Olatunde, B.J. and Otonekwu, I. P. (2007). Replacement value of *Etanda africana* seed meal for soybean meal in diet of growing West African dwarf goats. *African Journal of Agricultural Research.* 2 (10):555-557.

Belewu, MA, Fagbemi, T., Dosumu, O.O., Adeniyi, MO. (2008). Physico-chemical and anti-nutritional properties of lesser-known tree and leguminous seeds. *International Journal of Agricultural Research*, 3(3):237-242.

Burkill, M.H. 1995. The Useful Plants of Tropical Africa, Families J–L, vol. 3. Royal Botanic Gardens Kew, pp. 229–230.

Kanyinji F. and Sichangwa M. (2014). Performance of Broilers Fed Finishing Diets with Fermented Cotton Seed Meal as Partial Replacement for Soybean Meal. *Journal of Animal Production Advances*, 4(7): 931-938.

Makinde OJ, Aremu A, Alabi OJ, Jiya EZ and SO Ajide (2019). Effects of Different Processing Methods on Nutrient and Anti-Nutrient Compositions of African Star Apple (*Chrysophyllum albidum*) Kernels. *African Journal of Food, Agriculture, Nutrition and Development*, 19(4):14848-14862.

Nielsen, I.C. 1992. Legumineuses-Mimosoidees. Flore du Cambodge du Laos et du Vietnam, Fasc. Mus. Natl d'Histoire Naturalle, Paris 11 (1), 1–226.

Okunade, S.A., Isah, O.A., Aderinboye, R.Y. and Olafadehan, O.A., (2015). Effect of browse plant foliage supplementation on the performance of buckling goats fed threshed sorghum top basal diet, *Tropical Animal Health and Production,* 17:529-538.

SAS (2015). Statistical Analysis System Institute. User's guide. Version 9.3, SAS Institute Inc. Cary, N. C.

Sharma, M., Kumar, A., 2013. Leguminosae (Fabaceae) in tribal medicines. *Journal of Pharmacognosis and Phytochemistry*. 2 (1):276–283.

Wafar J. R (2013). Effects of Replacing Toasted Sorrel Seed (*Hibiscus Sabdariffa)* Meal for Soybean Meal in Broiler Finisher Diet. *Journal of Animal Production Advances,* 3(8):247-253. DOI: 10.5455/japa.20130806060039.