POS -43

Replacement Value of Cooked Sandbox Seed Mealfor Soybean Meal in Broiler Starter Diet

E. Ozeudu, C.O. Iheanacho, C.O. Offordile, E.B. Etuk, O.O.Emenalom and B.O. Esonu
Department of Animal Science and Technology, Federal University of Technology, Owerri, Nigeria
Corresponding author: E. Ozeudu; E-mail: ozeuduemmanuel@gmail.com

Abstract
A 21-day feeding trial was conducted to determine the replacement value of cooked sandbox *(Hura crepitans*) seed meal for soybean meal in Broiler starter diet. Four experimental Broiler starter diets were formulated, such that the diets contained cooked sandbox seed meal at 0%, 5%, 10% and 15% dietary levels. One hundred and eighty (180) birds were selected and divided into four groups of 45 each and randomly assigned to the four treatment diets in a Completely Randomized Design (CRD). Each treatment group was further subdivided into three replicates of 15 birds each and housed in a compartment measuring 8 × 10 meters. Water and feed were supplied ad-libitum. Data were collected on feed intake, body weight gain and feed conversion ratio. There was significant difference ($p<0.05$) in feed intake and body weight gain among the treatment groups but there was no significant difference among the treatment groups in feed conversion ratio. The group 15% cooked dietary level recorded the highest feed intake (61.34g) while the group on 0% dietary level recorded the least feed intake (48.54g). The group on 15% cooked sandbox seed meal recorded the highest body weight gain of 17.80 while the group on 0% recorded the least body weight gain 16.79 g. The result of this study suggested that cooked sandbox (*Hura crepitans*) seed meal could enhance the performance of broiler starter at 5%, 10% and 15% cooked dietary levels.

Keyword: Sandbox seed, *Hura crepitans,* soybean, broiler starter, feed

Introduction

Costly compounded commercial feedsare the major constraint to poultry production in the tropics. The scarcity and increased cost of poultry feed has been attributed to competition between man and livestock for conventional feedstuff such as maize, groundnut, soybean etc (Esonu *et al.,* 2014). The search for locally available feedstuff has been intensive, and one of such target feed resources is the sandbox seed (*Hura crepitans*).The tree (Hura) is a shade tree with a thorny trunk commonly found on roadsides, in towns and villages in Nigeria. The woody segment fruit is like a garden egg in shape and when dry burst with a large report releasing flattened circular seeds of about 18-20mm in diameter from its chamber. There have been reports of free ranging turkeys scrambling to pick and swallow whole seeds as they burst forth from dehiscing fruits (Esonu *et al.,* 2014). Similarly, children are seen cracking and consuming the endosperm of the seeds, in both cases and no adverse effect has been reported from these actions (Yaakugh *et al.,* 2001).

The nutrient composition of the sand box seeds as reported by Yaakugh *et al.* (2001) shows that the seed is remarkably high in protein, fats and oil, with the protein having much higher levels of essential amino acids like lysine, methionine, threonine, and histidine compared with the soybean seed. The mineral content is similar to the levels in the conventional oilseeds except that it is very low in phosphorus. Recent research conducted by Esonu *et al.*(2014) and Ozeudu *et al*. (2015) indicate that low inclusion level of sand box seed meal results in improved performanceof broiler starter.

This study was conducted to determine the replacement value of cooked sandbox *(Hura crepitans*) seed meal for soybean meal in broiler starter diets.

Materials and Methods

The seeds were cooked for one hour at temperature of 100^{o}C, sun dried for two days and crushed in a hammer mill. The crushed seed was sun dried again for two days to produce cooked sand box meal (CSBM). The sample of the processed seed meals was subjected to proximate analysis according to AOAC (1995), to determine its proximate composition.Four experimental Broiler starter diets were formulated, such that the diets contained cooked sandbox seed meal at 0, 5, 10 and 15% levels respectively. Other ingredients were adjusted in such a way that the diets were iso-nitrogenous and met nutrient requirements of the starting broiler. Ingredient composition and analyzed chemical composition of the diets are presented in table 1.

One hundred and eighty (180) birds were selected and divided into four groups (4) of forty-five birds each and randomly assigned to the four treatment diets in a Completely Randomized Design (CRD). Each treatment group was further subdivided into three replicates of fifteen (15) birds each and housed in a

compartment measuring 8 × 10. Feed and water was provided ad-libitum, the compartments were heated using 200 watt electric bulbs and other routine poultry management practices maintained. Feed intake was recorded daily, the birds were weighed weekly and feed conversion ratio computed accordingly.The trial lasted for 21 days.

Data collected were subjected to analysis of variance (ANOVA) andsignificant differences inmeans compared using Duncan New Multiple Range Test (DNMRT) as outlined by Obi (1990).

Table 1: Ingredient Composition of Experimental Diets

Dietary Levels (%)	0%	5%	10%	15%
Ingredients				
Maize	52.00	52.00	52.00	52.00
SBM	28.00	26.60	25.20	23.80
SBXM	0.00	1.45	2.80	4.20
PKC	5.00	5.00	5.00	5.00
Wheat Offal	9.00	9.00	9.00	9.00
Fish Meal	.00	2.00	2.00	2.00
Bone Meal	3.00	3.00	3.00	3.00
Vitamin premix*	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Total	100	100	100	100
Calculated chemical composition of the experimental diets				
Crude Protein	22.12	21.81	21.50	21.18
Crude fibre	4.62	4.54	4.52	4.51
Ether Extract	3.78	3.77	3.75	3.74
Calcium	0.15	0.15	0.14	0.14
Phosphorous	1.38	1.35	1.37	1.38
ME(kcal/kg)	302.2	300.7	299.2	297.18

*To provide the following per kg diet: Vit.A10000iu. Vit.D 2000iu,Vit.E 5iu, Vit.k 2.5mg, Riboflavin 5.5mg, Vitamin 12, 0.01mg, Vitamin Z, 0,01mg, Pantothenic acid, 6mg, Niacin, 5mg, Chlorine 3mg, Folic acid4mg, Mn 8mg, Zn 0.5mg, Iodine 1.0mg, Co 1.2mg, Cu 10mg and Fe 20mg.

Results and Discussion

The nutrient and analyzed chemical composition of the experimental diets are shown in table 2, while data on the performance of the chicks are shown or summarized in table 3. Birds on 15% dietary level recorded significantly ($p<0.05$) higher feed intake and daily weight gain than the birds in other groups with the average daily feed intake, average final body weight,average body weight changes and average daily weight gainincreasing as the inclusion level of sand box meal increased.There was no significant difference ($p>0.05$) among the treatment groups in feed conversion ratio. However the groups on 0% cooked dietary level recorded the best feed conversion ratio,while the group on 15%dietary level recorded the poorest ratio.

Table 2: Proximate composition of raw and cooked sand box seed

Components (%)	RSBM	CSBM
Dry Matter	90.381	90.979
Crude Protein	23.696	21.507
Crude Fibre	5.659	16.300
Ether Extract	2.712	7.589
Ash	6.026	5.240
Nitrogen Free Extract	52.897	45.633

All values expressed on 100% DM

The crude protein value of cooked sandbox meal (21.507). This protein value makes sandbox seed a probable supplement to cereal based diet (Sakarika *et al.,* 1999) and alternative vegetable protein source than most other unconventional tropical legumes (Seena *et al.,* 2006). *Hura crepitan* seed also contains oil which

enhances the energy density of the diet for normal maintenance and productive function, it also serve as a source of essential fatty acids as well as carrier of the fat soluble vitamins (Esonu *et al.,* 2014). Yaakugh *et al.*(2001) reported that sandbox seed contains some minerals like sodium calcium and potassium which are important in the general development of an animal.

Table 3: Performance of broiler starter chicks fed on cooked sandbox seed meal

Parameters	0%	5%	10%	15%	SEM
Average initial body weight (g)	151.39	151.29	151.70	151.20	-
Average final body weight (g)	504.14	513.21	516.00	525.00	18.05
Average body weight changes (g)	352.35	361.61	364.40	373.80	12.15
Average daily weight gain (g)	16.79^{b}	17.23^{b}	17.34^{b}	17.80^{a}	8.15
Average daily feed intake (g)	48.54^{b}	53.91^{b}	54.26^{b}	61.34^{a}	4.06
Feed conversion ratio (g)	2.89	3.12	3.12	3.44	15.05
Mortality	-	-	-	-	-

ab means within row with different subscripts are significantly different ($p<0.05$)
SEM: Standard Error Mean.

Conclusion

Resultsofthis experiment shows that cooked sandbox (*Hura crepitans*) seed meal could be used to formulate starter broiler diets to replace soybean at up to 15% inclusion level.

References

AOAC (1995). Official methods of analysis. Association of Official Analytical Chemist,Washington DC.

Esonu, B.O., Ozeudu, E., Emenalom, O.O., Nnaji, C., Onyeikegbulam, I.K. (2014). Nutritional value of sandbox (*Hura crepitans*) seed meal for broiler finisher birds. *J. of Natural Science Research,* 4(23).

Obi, I.U. (1990). *Statistical method of detecting differences between treatment means,* 2nd Edition, Snap Press, Enugu.

Ozeudu, E., Esonu, B.O. and Emenalom, O.O. (2015). Performance of starter broiler chicks on sandbox (*Hura crepitans*) seed meal. Nigerian J. of Animal Production, 42.

Saganka, E., Nol, R.J. and Baboo, M.N., (1999). Proximate composition, mineral and amino acid content of mature *Canavalia gladiate* seeds. *Food Chemistry*, 66: 115-119.

Seena, S.K., Sridhar, R., Arun, A.B. and Chichung, Y. (2006). Effect of roasting and pressure-cooking on nutritional and protein quality of seeds of mangrove legume *Canavalia cathartica* from South-West coast of India. *J. Food composition and Analysis,* 19:284-293.

Yaakugh, I.D.I., Tuleun, C.D. and Kaankuka, F.G. (2001). Nutrient composition of hura. Department of Animal Production, University of Markurdi, Nigeria.