EVALUATION OF COOKED SANDBOX (UNDECANTED)SEEDMEAL (*Huracrepitans*) AS AN ALTERNATIVE PROTEIN SOURCE FOR BROILERS.

Esonu, B.O; Ozeudu; E; Uchegbu; M.C; Udedibie; A.B.I.
Department of Animal Science and Technology, Federal University of Technology, Owerri, Nigeria.
Corresponding Email: esonubabs@yahoo.com

ABSTRACT
A 21-day feeding trial was conducted to determine the alternative value of cooked sandbox (Huracrepitans) undecanted seed meal as alternative protein source in Broiler starter diet. Four experimental Broiler starter diets were formulated, such that the diets contained cooked sandbox undecanted seed meal at 0%, 5%, 10% and 15% dietary levels. One hundred and eighty (180) birds were selected and divided into four groups (4) of forty-five birds (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 fifteen (15) birds each and housed in a compartment measuring 1.5 × 2 meters. Water and feed were supplied ad-libitum. Data were collected on feed intake, body weight gain and feed conversion ratio. When analysis of variance indicated significant difference, means were compared using Duncan New Multiple Range Test (DNMRT) as outlined byObi (1990). There was significant differences ($P<0.05$) in feed intake and body weight gain among the treatment groups. There was no significant difference among the treatment groups in feed conversion ratio. The group on 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 also recorded the highest body weight gain of 17.80, while the group on 0% recorded the least body weight gain 16.79. The result of this study suggested that cooked sandbox (Huracrepitans) seedmeal could replace and enhance the performance of broiler starter at 15% dietary levels.
Key words : Sandbox meal, Heat treatment, Broiler starter production

INTRODUCTION

Poultry production represents the fastest means of correcting the shortage of animal protein intake (Howard 2010). This is because apart from their high rate of production, poultry has the best efficiency of nutrients transformation into high quality animal protein although the cost of this transformation is very high, nutrient supply has to be judiciously manipulated to ensure the production of meat at economic rates. Energy feedstuff constitute between 60% to 75% of finished feed for monogastric animals. Energy feedstuff constitute between 60% to 75% of finished feed for monogastric animals, (Esonu*etal*, 2014). The poultry industry is undergoing a turbulent period and some farmers have closed down production and others have been forced to reduce their production capacity due to high cost of feed and feedstuff (Esonu*etal* 2001). High priced compounded feed has been a 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, soyabeanetc (Esonu*etal* 2006).The search for locally available cheap feedstuff has been intensive, one of such target feed resources is the sandbox seed (*Huracrepitans*) Keays, (2010).

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 observation of some free ranging turkeys scrambling to pick and swallow whole seeds as they burst forth from dehiscing fruits (Ozeudu*etal*, 2015.; Esonu*etal;* 2014). Similarly, children are seen cracking and consuming the endosperm of the seeds, in both cases and no adverse effect reported from these actions (Yaakugh, 2001).Recent trial conducted at this station using decanted raw sandbox seed mealindicated that low level of inclusion of sand box seed meal performed better than the groups on control (0%) in broiler starter (Esonu*etal*, 2014 and Ozeudu*et al* 2015). The nutrient composition of the sand box seeds as reported by Esonu*et al* (2014) shows that a seed with a tough seed coat (about 30% of seed weight) which on removal yielded a product remarkably high in protein (38 - 39%) fats and oil (up to 51%) and a much higher level of some essential amino acids like lysine (5.36%), methionine (0.92%), threonine (1.92%), and histidine (1.61%) compared with the soyabean seed levels (2.67, 0.60, 1.68 and 1.12 respectively). Yaakugh*et al* (2001) reported that the mineral content is similar to the levels in the conventional oilseeds except that it is very low in phosphorus (0.06 – 0.08%).

MATERIALS AND METHODS

The experiment was conducted at the Teaching and Research farm of the School of Agric and Agric Technology of the Federal University of Technology Owerri, Imo State, Nigeria. Owerri is in the South-eastern agro-ecological zone of Nigeria. The climatic

data of Owerri have been summarized from the Ministry of Lands and Survey Atlas owerri, Imo State (1984). Owerri is located at an altitude of 90m. The mean annual rainfall, temperature and humidity are 250mm, 26.5-27.5^{o}C and 70-80%, respectively. The duration of the dry season (number of months with less than 65mm rainfall) is 3 months and the mean annual evaporation is 1450mm. The soil is sandy loam with an average pH of 5.5.

Matured sand box seeds were collected from trees in villages around Ohaji / Egbema local government Area of Imo State. Nigeria.

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 seeds were further sun dried for two days to produce cooked sand box undecanted seed meal (CSBUSM).(That is full-fat cooked sand box seed meal.)

The sample of the processed cooked sand box undecanted seed meals was subjected to proximate analysis according to AOAC (1995), to determine its proximate composition and phytochemical analysis. (Table 1)

Four experimental Broiler starter diets were formulated, such that the diets contained cooked sandbox seed meal to replace soya bean meal at 0.0%, 5.0%,10.0% and 15.0% levels respectively.

Other ingredients were adjusted in such a way that the diets were iso-nitrogenous and isocaloric to meet nutrient requirements of the starting broiler (Obioha, 1992). Ingredient composition and analysed chemical composition of the diets are presented in table 2.

One hundred and eighty (180) 7-day-old birds were divided into four groups (4) of forty-five birds each and randomly assigned to one of the four treatment diets in a Completely Randomized Design (CRD). Each treatment group was further subdivided into three replicates of fifteen (15) birds and housed in a compartment measuring 1.5m × 2m. Feed and water were provided ad-libitum, the compartments were heated using 200 watt electric bulbs and other routine poultry management practices were maintained.

Feed intake was recorded daily, the birds were weighed weekly and feed conversion ratio computed accordingly Data collected were subjected to analysis of variance (Snedecor and Cochran 1978). When analysis of variance indicated significant difference, means were compared using Duncan New Multiple Range Test (DNMRT) as outlined byObi(1990). The trial lasted 21 days.

The proximate composition of cooked sand box seed meal is presented in Table 1, the nutrient and analysed 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. There was significant difference ($P<0.05$) in feed intake among the treatment groups The average daily feed intake of the experimental groups were**48.54g, 53.91g, 54.26g, and 61.34g** for 0.0%, 5.0%, 10.0% and 15.0% cooked respectively. Birds on 15.0% dietary level recorded significantly ($P<0.05$) higher feed intake than the birds on 0.0%, 5.0% and 10.0% dietary levels. The group on 15% recorded the highest feed intake (61.34g), while the group on 0% dietary level recorded the least feed intake (48.54g). There was also significant difference ($P<0.05$) in body weight gain among the treatment groups. The body weight gain values were **16.79g, 17.23g, 17.34g, 17.80g**for 0%, 5%, 10% and 15% cooked respectively. Birds on 15% cooked sand box seed meal recorded significantly ($P<0.05$) higher body weight than the groups on 0%, 5%, and 10% dietary levels .

The group on 15% dietary level recorded the highest body weight gain (17.80g), while the group on 0% dietary level recorded the least body weight gain (16.79g).

There was no significant difference ($P>0.05$) among the treatment groups in feed conversion ratio.The groups on 0% cooked dietary level recorded the best feed conversion ratio **(2.89)**

Table:1; Proximate composition of cooked sand box seed

Components (%)	**CSBUSM**
Dry matter	90.979
Crude protein	21.507
Crude fibre	16.300
Ether extract	7.589
Ash	5.240
Nitrogen free extractive	45.633

All values expressed on 100% DM

*****CSBUSM = Cooked sand box undecantedseedmeal.

Table 2: Ingredient Composition of Experimental Diets

	Dietary Levels (%)			
Ingredients	0.0%	5.0%	10.0%	15.0%
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
Lycine	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	100.0	100.0	100.0	100.0
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	0.14	0.14.	0.14
Phosphorous	1.38	1.35	1.37	1.38
ME(kcal/kg)	3022.0	3007.0.	2992.0.	2971.8

*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, Panthothamic acid, 6mg, Niacin, 5mg, Chlorine 3mg, Folic acid4mg, Mn 8mg, Zn 0.5mg, Iodine 1.0mg, Co 1.2mg, Cu 10mg and Fe 20mg.

TABLE 3.0: Performance of Broiler Starter Chicks Fed Cooked Sandbox (*Huracrepitans*) 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	0.0	0.0	0.0	0.0	0.0

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

DISCUSSION

The result of this study shows that birds on cooked sandbox (*Huracrepitans*) seed meal at 15% performed better than the 0%, 5% and 10% groups.

The proximate composition of raw sandbox seed meal is shown in Table 1. The crude protein value of cooked sandbox meal (21.507).This protein value makes sandbox seed a probable supplement to cereal based diet with crude protein 8.55% or below (Sagankaetal, 1999) and alternativevegetable protein source than most other unconventional tropical legumes (Seenaetal; 2006).Protein are the basic structural material from which all body tissue are formed –muscles, skin, nerves, blood cells, hair hooves, horn, etc. It is required for faecal development and milk production. Body enzymes and hormones are basically proteins and no other nutrient can replace protein in the ration, (Esonu, 2006). These proteins can be denatured or changed from their natural state and when this happens, it looses it effect on man and livestock.*Huracrepitan* seed also contain 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, *etal*, 2004). It had been reported by (Esonu, et al 2014), that sandbox contains some minerals like sodium (Na), Calcium (Ca), Potassium (K) that are of important in the general development of an animal. This probably may have influenced the general performance of the birds on the test material at 15% (CSBM) dietary level over the group on control diet. The result from this experiment shows that cooked sandbox

(*Huracrepitans*) seed meal could replace soya bean meal in broilerchicks diets 15% dietary level.

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