GROWTH PERFORMANCE OF FINISHER BROILER CHICKENS FED RAW *SENNA OBTUSIFOLIA* SEED MEAL

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ABSTRACT

An experiment was undertaken to evaluate the growth performance of finisher broiler chickens fed raw Senna obtusifolia seed meal. One hundred and fifty (150) arbor acre day old unsexed broilers were purchased from a reputable supplier in Uyo metropolis. The birds were randomly allotted to five experimental treatments with 30 birds per treatment. Each treatment was replicated thrice with 10 birds per replicate, in a Completely Randomized Design (CRD). Treatment 1 was control while Senna obtusifolia seed meal was included at 2.5, 5, 7.5 and 10g/kg respectively in Treatments 2, 3, 4 and 5. Feed and water were provided ad libitum throughout the experiment which lasted for 56 days. Growth performance parameters evaluated were initial weight, final weight, weight gain, average feed intake, feed conversion ratio, feed efficiency ratio, daily protein intake and protein efficiency ratio. Data were analysed using a one-way analysis of variance and significant means were separated using the Duncan Multiple range test using SPSS version 25.0. The results of growth performance showed there were significant differences (P<0.05) in all parameters measured, except on initial weight and mortality. Mean values of birds fed up to 5% inclusion level of raw SOSM was not significantly different (P>0.05) from the control in final weights, average daily weight gain, feed conversion ratio and protein efficiency ratio. The mean values of final live weight obtained in this study ranged from 2268g for birds fed control (T1), 2238g for birds fed T2, 2187.67g for birds fed T3, 1895g for birds fed T4 to 1866.67g for birds fed T5 diets respectively. It was observed that birds fed up to 5% dietary inclusion of raw SOSM compared favorably with the control group in terms of final live weight, though significantly different from birds in T4 and T5, which were also statistically similar. This study revealed that birds fed control diet (T1) utilized nutrients similarly (P<0.05) with those on T2 and T3, which however varied significantly (P<0.05) when compared with those on T4 and T5 diets. In conclusion, raw SOSM can be included up to 5% in the diet of finisher broiler chickens without any deleterious effect.

Keywords: Performance, Cut parts, Internal organs, Finisher broilers, *Senna obtusifolia* seed

INTRODUCTION

According to Assam *et al.,* (2024), animal feed situations in Nigeria today is a national issue and have become one of great concern. Today, the average price of a 25kg bag of poultry feed is between twenty five and twenty-nine thousand. This has forced a lot of poultry farmers out of business, since feed accounts for a greater percentage of poultry production (Assam, 2024). Thus, there is a fall in animal protein supply to meet the needs of Nigerians. FAO (2022) reported that per capita egg consumption in Nigeria is put at 78.48 compared to 285.50 for USA, 128.2 for South Africa and 340 for Mexico. Nigerians also consumes 1.9 Kg poultry meat per person per annum compared to 49.3 Kg for USA, 7.67 Kg for Ghana and 32.98 Kg for South Africa. Similar trend can also be seen for beef and milk, with Nigeria's per capita milk consumption of 6.75 litres compared to World Health Organization's recommendation of 210 litres (Jimoh, 2024). Animal protein is important in human nutrition because of its very high biological value compared to plant protein. This, therefore calls for solutions to check the steadily increasing prices of feeds to encourage more people to get back into poultry production and increase animal protein supply. One such solutions involve the use of alternative, cheap feedstuff like *Senna obtusifolia* seed meal to achieve the least cost ration for poultry, especially broiler chickens (Assam *et al.,* 2017). *Senna obtusifolia* is also known as sicklepod, foetid cassia, sickle senna, Chinese senna, coffee weed, coffee pod, java bean, or arsenic weed. It is a dicot legume plant in the family *Fabaceae*, subfamily *Caesalpinoideae,* and genus *Senna* (ILDIS, 2005; Nature serve, 2007). Assam *et al.* (2017) reported that raw *Senna obtusifolia* seeds contained 88.50% dry matter, 11.50% moisture content, 9.63% crude protein (CP), 2.0% ether extract (EE), 10.0% crude fibre (CF), 5.0% Ash, 73.37% Nitrogen Free Extract (NFE), and 3.594 Kcal/g gross energy. It was in light of the foregoing that this research was undertaken to evaluate response of finisher broiler chickens to diets containing raw *Senna obtusifolia* seed meal.

MATERIALS AND METHODS

The research was conducted at the Poultry Unit of Teaching and Research Farm, University of Uyo, Uyo, Akwa Ibom State. Uyo is located on latitude 4^0 59^1 and 5^0 04^1N and longitude 7^0 53^1 and 8^0 00^1E, with an elevation of about 60.96m above sea level. Uyo has a bi-modal rainfall pattern with mean annual rainfall of 2190mm and mean relative humidity of 81% (University of Uyo Meteorological Station Report, 2000). One hundred and fifty (150) arbor acre day old broilers were purchased from a reputable supplier in Uyo metropolis.

TABLE 1: Composition Experimental Starter Diet (%DM)

Ingredients %	Control	Levels Of Inclusion (%)			
	0(T1)	2.5(T2)	5.0(T3)	7.5(T4)	10.0(T5)
Maize	48.18	46.71	44.26	41.81	39.34
Soybean meal	33.81	33.79	33.74	33.69	33.66
SOSM*	-	2.50	5.00	7.50	10.00
Palm kernel meal	10.00	10.00	10.00	10.00	10.00
Fishmeal	3.00	3.00	3.00	3.00	3.00
Bone meal	3.00	3.00	3.00	3.00	3.00
Methionine	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25
Vit/TM premix*	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Calculated Nutrients					
Crude Protein	23.00	23.00	23.00	23.00	23.00
ME (Kcal/g)	2850	2832	2813	2795	2776

*1kg of premix contains: vitamins A (5,000,000Iu), Vitamin D_3 (1,000,000 1U), Vitamin E (16,000mg), vitamin K_3 (800mg), vitamin B_1 (1,200mg), Vitamin B_2 (22,000mg), Niacin (22,000mg), Calcium panthothenate (4,600mg), Vitamin B6 (2000mg), Vitamin B_{12} (10mg), Folic acid (400mg), Biotin (32mg), Choline chloride (200,000mg), Manganese (48,000mg), Iron (40,000mg), Zinc (32,000mg), Copper (3,400mg), iodine (600mg), Cobalt (120mg), Selenium (40mg), antioxidant (48,000mg). *SOSM= *Senna obtusifolia* seed meal

TABLE 2: Composition Experimental Finisher Diet (%DM)

Ingredients %	Control	Levels Of Inclusion (%)			
	0(T1)	2.5(T2)	5.0(T3)	7.5(T4)	10.0(T5)
Maize	53.07	51.04	48.56	46.12	43.65
Soybean meal	25.93	25.46	25.41	25.36	25.35
SOSM*	-	2.50	5.00	7.50	10.00
Palm kernel meal	15.00	15.00	15.00	15.00	15.00
Fishmeal	2.00	2.00	2.00	2.00	2.00
Bone meal	3.00	3.00	3.00	3.00	3.00
Methionine	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25
Vit/TM premix*	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Calculated Nutrients					
Crude Protein	20.00	20.00	20.00	20.00	20.00
ME (Kcal/g)	2903	2889	2870	2852	2833

*1kg of premix contains: vitamins A (5,000,000Iu), Vitamin D_3 (1,000,000 1U), Vitamin E (16,000mg), vitamin K_3 (800mg), vitamin B_1 (1,200mg), Vitamin B_2 (22,000mg), Niacin (22,000mg), Calcium panthothenate (4,600mg), Vitamin B6 (2000mg), Vitamin B_{12} (10mg), Folic acid (400mg), Biotin (32mg), Choline chloride (200,000mg), Manganese (48,000mg), Iron (40,000mg), Zinc (32,000mg), Copper (3,400mg), iodine (600mg), Cobalt (120mg), Selenium (40mg), antioxidant (48,000mg). *SOSM= *Senna obtusifolia* seed meal

Two weeks to the arrival of the chicks, the poultry house was cleaned, washed and disinfected. Prior to the arrival of the chicks, the brooder was heated up using kerosene stove and electric bulbs. Also, black tarpaulin was used

to cover the brooder to conserve heat. The floor of the brooder was sprayed with wood shavings of 2cm thickness covered with sheets of newspaper to ease movement of the chicks. Feeding and drinking troughs were provided. Necessary vaccinations and medication were carried out. On arrival, the chicks were weighed and given anti-stress (glucose) in drinking water. The birds were randomly allotted to five experimental treatments with 30 birds per treatment. Each treatment was replicated thrice with 10 birds per replicate, in a Completely Randomized Design (CRD). Treatment 1 was control while *Senna obtusifolia* seed meal was included at 2.5, 5, 7.5 and 10g/kg respectively in Treatments 2, 3, 4 and 5 (Tables 1 and 2). Feed and water were provided *ad libitum* throughout the experiment which lasted for 54 days. Feed intake and weight gain were determined weekly throughout the experiment.

RESULTS AND DISCUSSION

The growth performance of finisher broiler chickens fed raw *Senna obtusifolia* seed meal (SOSM) is as presented in Table 3. There were significant differences ($P<0.05$) in all parameters measured, except on initial weight and mortality. Mean values of birds fed up to 5% inclusion level of raw SOSM was not significantly different ($P>0.05$) from the control in final weights, average daily weight gain, feed conversion ratio and protein efficiency ratio. However, birds fed T2 (2.5%) diet compared favorably with the control diet in terms of average daily feed intake. The mean values of final live weight obtained in this study ranged from 2268g for birds fed control (T1), 2238g for birds fed T2, 2187.67g for birds fed T3, 1895g for birds fed T4 to 1866.67g for birds fed T5 diets respectively. Also, average daily feed intake ranged from 99.14g for birds fed control diet to 93.03g for T5 (10%) diet.

Table 3: Performance of Finisher Broiler Chickens fed Raw *Senna obtusifolia* meal from Day one to Market Weight

Parameters	Levels of Inclusion of Raw *Senna obtusifolia* Seed Meal					SEM
	T1 (0%)	T2 (2.5%)	T3 (5%)	T4 (7.5%)	T5 (10%)	
Initial weight (g)	38.02	38.02	38.02	38.02	38.02	0.00
Final weight (g)	2268.00 [a]	2238.00 [a]	2187.67 [a]	1895.00 [b]	1866.67 [b]	54.49
Average Daily Weight Gain(g)	39.82 [a]	39.29 [a]	38.39 [a]	33.16 [b]	32.65 [b]	0.97
Average Daily Feed Intake (g)	99.14 [a]	98.22 [a]	94.08 [b]	93.61 [b]	93.03 [bc]	0.96
FCR (g feed/g gain)	2.49 [b]	2.50 [b]	2.45 [b]	2.82 [a]	2.85 [a]	0.05
Protein Efficiency Ratio	2.01 [a]	1.99 [a]	2.03 [a]	1.77 [b]	1.75 [b]	0.02
% Mortality	0.00	3.70	0.00	0.00	3.70	1.01

[a,b,c] Means with different superscripts in the same row are significantly different ($P<0.05$)

The average daily weight gain of 38.39g recorded for birds fed 5% dietary inclusion of raw SOSM (T3) and 32.65 for 10% (T5) are numerically higher than 33.57 and 22.67 reported by Akinmutimi (2004), when raw sword bean was fed to finisher broiler chickens. It was observed that birds fed up to 5% dietary inclusion of raw SOSM compared favorably with the control group in terms of final live weight, though significantly different from birds in T4 and T5, which were also statistically similar. The final weights in this study are numerically higher than 1865, 1492, 1013, 520 and 417g obtained by Akinmutimi (2004) when raw sword bean replaced soybean meal at 0, 5, 10, 15 and 20% respectively in finisher broiler diet. The non-significant difference ($P>0.05$) recorded for T4 and T5 in terms of final weight may probably be because of poor feed and poor nutrient utilization as reflected in both mean values of average daily weight gain and feed intake due to the presence of anti-nutritional factors. For instance, high tannins, an anti-nutrient, in diet of animals adversely affects digestibility of proteins and carbohydrate, thereby reducing growth, feeding efficiency, metabolizable energy and bio-availability of amino acids (Assam 2017). Also, phytate, another anti-nutrient, binds to minerals like Ca, Zn, Mn, Fe and Mg forming complexes, which are indigestible substances, thereby limit absorption of minerals and thus growth rate (Assam, 2017). The dietary fibre may have exerted its depressive effect on feed intake by causing early gut fill. Augustine *et al.* (2010) reported that fibrous feeds tend to spend a long time in the digestive tract, thereby resulting in reduced feed intake. The feed conversion ratio (FCR) increased across dietary treatments, which was in line with the earlier report for broilers on the starter phase. This study revealed that birds on control diet utilized nutrients similarly ($P<0.05$) with those on T2 and T3, which however varied significantly ($P<0.05$) when compared with those on T4 and T5.

CONCLUSION

In conclusion, raw SOSM could be included up to 5% as a low-cost alternative feed ingredient in the diet of finisher broiler chickens without any deleterious effect.

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