CARD International Journal of Medical Science and Applied Biosciences (IJMSAB)
ISSN: 2536-7331 (Print): 2536-734x (Online)
Volume 2, Number 3, September 2017
http://www.casirmediapublishing.com

Performance, Carcass Characteristics, Growth, Haematology and Serum Biochemistry of Broiler Chickens fed Processed *Senna occidentalis* Seed Meal

[1]Antyev, M.; [1] Nyameh, J.; [2]Shaahu, D.T.; [1]Highest, E. C. & [1]Uduak, W.
[1]Department of Animal Production Technology College of Agriculture, P.M.B. 1025 Jalingo, Taraba State-
[2]Department of Animal Production, University of Agriculture, Makurdi, Benue State Nigeria
Email: juliusfnyameh@gmail.com
Corresponding Author: Nyameh, J.,

ABSTRACT

The effect of processed *Senna occidentalis* seed meal on growth performance, carcass characteristics, Haematology and Serum biochemistry of broiler chickens were investigated on an 8 – weeks Anak-2000 broiler chicks in a group of 30 chicks per diet with 3 replicates of 10 birds each in a completely randomized design (CRD). The diets consist of a control (0%), 5.0%, 10.0% and 15.0% for treatments 1, 2, 3 and 4 respectively. The *Senna occidentalis* before inclusion in the diets was boiled for 1hour: 30 min and properly dried and grounded into meal for eight weeks, data were collected on feed intake, weight gain and feed conversion ratio. At the end of the experiment, 6 birds were randomly selected from each treatment and slaughtered to determine the effect of processed *Senna occidentali*s seed meal on carcass characteristic and internal organs weight. Blood samples were also collected from 6 birds were in each treatment for haematological and biochemical studies. Results from growth performance revealed that all the growth parameters were not significantly (P>0.05) affected by the inclusion levels of PSOSM but T3 had a better weight gain, while T4 recorded a better FCR (1.93).The values of carcass characteristic and internal organs weight also showed no significant (P>0.05) effects across treatments but variations were observed in the values obtained for gizzard. Supplementation levels of PSOSM did not affect the hematological and biochemical values except for urea. Therefore for better performance it is imperative that *Senna occidentalis* seed meal be included in broiler diet up to 5%.

Keywords: *Senna occidentalis*, Broiler, Performance, Haematology Carcass Characteristics

INTRODUCTION

Description of Problem

The conventional protein feedstuffs for poultry such as soybean, groundnut cake and fish meal are very expensive and they are competed for by humans as food and for other industrial uses. The search for alternative feed stuffs (Protein) in monogastric animal nutrition will therefore continue to be a necessity in developing countries.

The Nigerian poultry industry is unable to provide the needed animal protein to its teeming population because of the high prices in feed raw materials. In view of the aforementioned reason(s), it has become imperative to look for locally available and cheaper feedstuffs that can be utilized by poultry in Nigeria. An under-utilized wild sickle pod with nutritional potentials as alternative cheaper feedstuff is *Senna occidentalis* seed. This seed belong to the family *Leguminosae*. These legumes are found on road sides, grassland, uncultivated field as weeds and are wide spread in West Africa (Akobundu and Agyakwa, 1998).

The problem of protein deficiency in Nigeria is evidenced by the fact that average Nigerian consumes about 10g per day of the minimum daily protein intake recommended by food and agricultural organization (FAO, 1997). Mubarak (2005) has attributed the low protein intake to low level of animal protein and high cost of animal protein production and suggested the intensification of high reproductive animals with short generation intervals such as poultry, pigs and rabbits.

Hematology and serum biochemistry assay of livestock suggests the physiological disposition of the animals to their nutrition. Esonu *et al.,* (2001) stated that hematological constituents reflect the physiological responsiveness of the animal to its internal and external environments which include feed and feeding. Some researchers (Emenalom and Udedibe, 1998; Awosanya *et al*., 1999 and Iyayi(2001). This study therefore was aimed at evaluating processed *Senna occidentalis* seed meal on growth performance carcass characteristics, hematological and serum biochemical indices of broiler chickens.

MATERIALS AND METHOD

Experimental Site

The experiment was conducted at the poultry teaching and practical farm of the College of Agriculture, Jalingo Taraba State. Taraba state is located in the northeastern part of Nigeria. The state lies between latitude 6°30′ and 9°36′N of the equator and longitude 9°10 and 11°50′E of the green which meridian (TADP, 2004).

The state has a tropical climate marked by dry and rainy seasons. The rainy seasons starts in March/April and ends in October/November. The mean rainfall ranges from 800mm in the north to over 2000mm in the south. The minimum daily temperature recorded is 14.8°C and mean maximum daily temperature recorded is 34.4°C (TADP, 2004.)

Processing of *Senna occidentalis*

Dry *Senna occidentalis* seeds were collected within Jalingo in Taraba State. The pods were cracked open mechanically to remove the seed. The seeds were soaked in water for 48hours and later boiled for 1hour 30mins. The boiled seeds were then properly washed and sun dried and grounded into meal.

Experimental Birds, Management and Design

One hundred and twenty (120) day old (Anak, 2000) white strain unsexed broiler chicks were purchased from Ecwa farms in Jos Plateau State, Nigeria. The birds were managed on deep litter throughout the experimental period. Brooding was done at the first week of the experiment and the chicks were fed commercial broiler starter feed to stabilize them. The birds were then randomly allotted to the four (4) dietary treatments of 30 birds per treatment and were replicated three times with 10 birds per replicate in a completely randomize design. The birds were routinely vaccinated as described by Oluyemi and Roberts, (2000).

Experimental Diets

Four dietary treatments were formulated with processed *Senna occidentalis* seed meal (PSOSM) as a source of protein at 0%, 5%, 10%, and 15% for T1, T2, T3, and T4 as seen in Table 1. The PSOSM was analyzed for proximate composition, amino acid profile, minerals and anti-nutritional factors. The birds were fed the experimental diets and clean drinking water *ad libitum* for a period of 8weeks.

Table 1: Composition of the experimental diet

Ingredient%	Diets/Treatments			
	0%	5%	10%	15%
Maize	53.90	53.50	51.40	50.90
GNC	28.00	26.00	25.60	23.60
PSOSM	0.00	5.00	10.00	15.00
Maize Offal	10.00	10.00	10.00	10.00
Fish meal	3.00	3.00	3.00	3.00
Bone meal	2.00	2.00	2.00	2.00
Lime stone	2.00	2.00	2.00	2.00
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 Analysis				
Crude Protein	20.62	20.41	20.75	20.52
ME.(Kcal/kg)	2812.34	2827.28	2840.74	2858.04

Performance Characteristics

Known quantity of feed was supplied to the bird and the left over removed and weighed to determine the actual feed consumed on daily basis. The daily feed consumption was added together over a period of 7days to obtain the feed consumption per week, the body weights were taken on weekly basis. The difference between mean weights for two successive weeks was taken in order to obtain the average weight gain of birds per week. Feed conversion ratio was calculated as a ratio of feed consumed and body weight gain

$$\textbf{Feed conversion ratio} = \frac{\textbf{Feed intake}}{\textbf{Weight gain}}$$

Table 2: Growth Performance of Broilers

Parameters	Diets/Treatments				
	1	2	3	4	LSD
No. of Birds	30	30	30	30	
Initial body wt(g)	760.00	750.33	784.00	700.00	102.15
Final body wt(g)	2666.67	2466.67	2600.00	2533.33	611.4
ADFI (g)	80.65	77.00	69.57	63.33	12.40
ADWG (g)	34.04	30.64	32.43	32.74	19.76
FCR	2.37	2.51	2.15	1.93	4.61

Carcass Characteristics

At the end of eight (8) weeks of the experiment, two (2) birds per replicate were randomly selected. The birds were starved overnight, weighed and slaughtered by severing the jugular vein. They were weighed again to know the slaughtered weight after which they were eviscerated, cut into different parts and their weights recorded organs weight such as liver, spleen, kidney and heart were also recorded.

Table 3: Carcass Evaluation of broiler finisher

Parameters	Diets/Treatments				LSD
	1	2	3	4	
Live weight	1350.0[a]	1250.0[a]	1050.0[b]	1270.0[a]	226.74
Slaughter wt	1300.0[a]	1183.33[b]	966.66.0[c]	9183.33[b]	189.83
Plucked wt	1225.0[a]	1133.33[b]	933.33[c]	1133.33[b]	122.53
Dressed wt	1033.3[a]	1033.33[a]	800.00[c]	883.33[b]	189.83
Dressing %	76.00[ab]	79.66[a]	75.66[ab]	69.33[b]	19.35
Back	131.66[a]	140.00[a]	90.66[b]	92.33[b]	47.16
Breast	200.00[a]	200.00[a]	200.00[a]	173.33[b]	10.96
Thigh	173.33[a]	175.00[a]	123.33[b]	123.33[b]	10.96
Drumstick	318.35[a]	219.48[b]	197.24[a]	187.49[c]	19.55
Wings	227.55[a]	197.28[b]	195.60[b]	171.26[c]	12.71
Shanks	93.22[a]	82.40[a]	82.99[a]	76.26[b]	315.02
Neck	167.04[a]	117.68[b]	131.71[c]	110.12[d]	14.98
Head	60.09[a]	54.99[b]	57.83[b]	48.20[c]o	5.87
Chest	318.40[a]	220.90[c]	200.00[c]	270.00[b]	62.18
Gizzard	118.18[d]	140.52[a]	120.12[c]	128.15[b]	14.20
Liver	21.48[a]	21.77[a]	21.04[a]	20.72[a]	6.94
Lungs	30.40[b]	30.91[ab]	31.12[a]	28.73[c]	1.27
Spleen	5.34[a]	3.85[d]	4.84[b]	4.12[c]	1.17
Full intestine	352.95[b]	326.76[c]	361.24[b]	286.06[a]	19.32
Abdominal fat	113.69[a]	110.48[b]	25.79[c]	0.00[d]	7.22
Heart	33.99[a]	29.93[b]	24.60[c]	21.77[c]	7.12

Haematological and Biochemical Analysis

At the end of the experiment, three (3) birds were selected at random from each replicate. Five (5) mls of blood was collected from the wing vein of each bird into the sterilized bottles containing. Ethylene – diaminetetra-acetic acid (EDTA) for hematological parameters determination as described by Schrews (2000). The data generated from the blood analysis was used to calculate the erythrocytic

parameters which include the mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCHC) as described by (AOAC, 2000). Similarly, 5mls of blood samples were also collected into sterilized bottles without (EDTA) for biochemical analysis. The parameters determined were total protein, serum, albumin, creatinine, cholesterol and urea.

Table 4: Haematology and biochemical analysis of broiler finisher

Parameters	Diets/Treatments				
	1	2	3	4	LSD
PCV	26.00[b]	25.33[c]	26.00[b]	27.66[a]	1.26
Hb	8.56[a]	8.26[a]	6.56[b]	6.36[b]	1.07
RBC	3.20	3.26	3.46	3.20	0.72
WBC	1.76[c]	1.70[c]	2.23[b]	3.33[a]	0.79
Neutrophils	34.33[d]	37.66[c]	41.00[b]	44.66[a]	5.36
Lymphocytes	65.00[a]	62.66[b]	56.33[c]	56.33[c]	4.58
Monocytes	20.40	21.20	16.20	22.30	2.13
Electrocytes	0.00[a]	1.00[c]	4.33[b]	5.66[a]	1.79
MCV	110.78	108.64	106.64	105.90	0.51
MCH	81.36[d]	120.60[c]	130.20[a]	132.46[a]	3.36
MCHC	27.46[a]	21.66[b]	20.43[b]	20.90[b]	3.12
Biochemistry of Broiler Finisher					
Albumin	14.80[c]	15.38[b]	15.70[b]	16.66[a]	0.89
Creatinine	48.56[b]	43.60[c]	42.16[b]	60.73[a]	1.06
Urea	1.10[a]	1.01[a]	0.86[b]	0.63[a]	0.28
Total protein	31.26[d]	31.46[c]	35.26[b]	37.40[a]	0.82
Cholesterol	3.01[a]	2.28[b]	1.71[d]	2.02[c]	0.49

Chemical Analysis

The chemical analysis of the experimental diets *Senna occidentalis* seed meal and anti-nutritive factors were carried out according to the methods described by (AOAC, 2000).

Statistical Analysis

Data collected were subjected to analysis of variance (Steel and Torrie, 1980) and significant differences between means were compared using least significant difference as described by (Obi)

RESULT AND DISCUSSION

The results of final weight, average daily feed intake (ADFI), average daily weight gain (ADWG) and feed conversion ratio (FCR) is presented in Table 2.

The initial weight range between 700.00g to 784.00g while final weight was between 2466.67 – 2666.67g. Average daily feed intake ranges from 63.33 – 80.65g while average daily weight gain ranges from 30.64 – 34.04g and feed conversion ratio was between 1.93 – 2.51 respectively. All the parameters measured were statistically different (P<0.05) across the dietary treatments.

There was a decrease in average body weight gain with increasing levels of *Senna occidentalis* seed meal. Average daily feed intake took a similar trend; the final body weight was also in the same pattern.

This observation agreed with Augustine *et al*., (2010). The values for feed conversion ratio was outstanding in dietary treatment group with (15%) inclusion level followed by (2.15) for treatment 3 with (10%) inclusion level. The result also agreed with Augustine et al (2010) the FCR which is an index of feed utilization was within the range recommended by Oluyemi and Roberts (2000) for broiler chicken in tropical condition but was similar to the work reported by Oko *et al* (2011). The birds were able to utilize the feed because of the processing of *Senna occidentalis* meal.

The results of carcass characteristics and internal organs weight is presented in Table 3. There was no significant difference (P>0.05) in all the parameters measured except for gizzard which was significantly (P<0.05) higher in treatment 2. Numerically, carcass weight was higher in treatment 1 and lowest in treatment 3.

The dressing percentage ranges from 69.33% - 79.66% respectively. There was no (P>0.05) significant difference in all the parameters measured for carcass and internal organs except for the gizzard. This result agreed with Yakubu and Alfred (2014) on sesame seed meal. The results of Hematological and serum biochemistry are presented in Table 4. All the parameters measured were not affected by *Senna occidentalis* seed meal. There was no significant (P>0.05) difference across the treatment for hematological values. While there was significant (P<0.05) difference for urea and all other serum biochemical parameters were not (P>0.05) significant.

Hematological traits PCV and Hb are correlated with the nutritional

status of the animal (Adejumo, 2004) the PCV values obtained in this study were within the normal range of 22 – 35% for broilers. The values of monocytes, hymphocytes and neutrophils were lower than the work reported by Banerjee (1998). Bamgbose *et al,* (2003) reported that total protein and albumin are indicators of the total protein reserve in an animal body. The values of creatinine were not influenced by the dietary treatment and this indicates the adequacy of in all the diets this result agreed with that reported by Sawsan *et al*., (2012) on Senna in Lonmann broiler chickens. The result in this study also agreed with Benerjee (1998) in his study on sources and types of protein observed significant variations in serum, creatinine and uric acid the values of cholesterol numerically decreased across the treatments and values contrast that reported by Benerjee (1998). Bamgbose *et al*., (2003) observed than the low values of cholesterol could be that *Senna accidentalis* inhibits cholesterol absorption from the intestine and synthesis in the liver. Bamgbose *et al* (2003) concluded that such mechanism of inhibiting cholesterol absorption from the intestine will reduce cholesterol deposition in poultry and poultry products which reduces the problem of coronary diseases in humans following the consumption of the products. The results obtained for *Senna occidentalis* seed meal was similar to other legume seed meals, without any adverse effects on the measured parameters of broiler chickens. It is therefore imperative that *Senna occidentalis* seed meal can be included in broiler's diet up to 15%.

REFERENCES

Adejumo, D. O. (2004) Performance, Organ Development and Haematological Indices of Rats fed Sole diets of graded levels of Cassava Flour and Soya bean flow (Soygari) as Substitutes for energy and protein concentrates. Tropical Journal of Animal Science. 7:57-63.

Akobundu, I. O. and Agyakwa C. W (1998) A hand book of West African Weeds 2nd edition published by INTEC Printers Ibadan. Pp 306.

Augustine, J. U. Igwebuike, S. Salome, A. Midau M.R. Ja,afar-furo, D. I. Mojaba and I.U. Dazala (2010) Evaluation of Economic Performance of

Broiler Cassie obtusifolia seed meal internal journal of sustainable Agriculture 2 (3) 47-50.

Augustine, C. Abdulrahaman B.S. Masudi B. and Ngiki Y.U. (2014). Comparative Evaluation of the pronimate composition and anti-nutritive components of Tropical Sickle Pod (Senna obtasifolia) and coffee senna (Senna occidentalis) seed meals in digenous to Mubi Area of Adamawa states Nigeria. Int. Journal of Management and Social Sciences Research (IJMSSR). 3: (2): 9 – 12.

Awosanya, B, J.K Joseph and S.O. Sowumi, (1999) Performance of rabbits on graded dietary levels of toasted levcacna levcocephala seed meal J. Applied Animal Res. 9:235-239.

Bamgbose, A.M; S.O. Nwokoro and O.O Tewe (2003) Serum Metabolites and Nutrient Utilization of Broiler fed Extroded full fat soyabean diets Journal of Arid Agriculture 13:167-171.

Bamerjee G. C (1998) A Textbook of Animal Husbandry 8th Edition Oxford and I.B.H Publishing Co. PVT – Ltd New Delhi, India.

Emenalon O.O and A.B.I Udedibie (1998) Effect of dietary raw, cooked, toasted mucona prurient seed velvet bean) on the performance of finisher broilers Nig. J. Animal Prod. 25-115-119.

Esonu, B.O O.O Emenalom A.B.I Udedibie, U. Herbert, C.F. Ekpor, I.C, Okolie and F.C, Theukwomere, (2001) Performance and blood chemistry of meaner pigs fed raw mucuna (velvet bean) Tropical Animal Production Investigation 4:49-54.

FAO (1997) Food and Agriculture Organisation, Year Book Rome, pp 129 – 142.

Ingweye, J. N., Kolio, G. A; Ubua J.; and Umoren, E. P. (2010) Nutritional Evaluation of Wild Sickle Pod (Senna obtusifolia) seed from obanliku, South-Easten Nigeria. American Journal of Food Technology 5(1): 1-12.

Ismaila, V. S. Denban, M.K and Augustine, C. (2011) Nutritional and Phyto-chemical Screening of Senna Obtusifolia Indigenous to Mubi, Adamawa state, Nigeria. Advances in Applied Science Research 2(3): 431 – 437.

Iyayi E. A. (2001) Cassava Leaves as Supplement for feeding meaner swine tropical animal production investment 4:141-150.

Mubarak A.E. (2005) Nutritional Composition and ant nutritional factors of mungbean seeds (Phaseohus aureus) as affected by some home traditional processed journal of food chem. 80:489-495.

Obi, I.U. (2002) Statistical methods of detecting differences between treatment and means and research methodology. ISSUES in laboratory and field experiments. AP express publishing company Ltd, 3 Obollo road Nsukka-Nigeria. Pp: 115.

Oko, O.O, K. I. E. Iso; P.S. Udo and J.I Mbore (2011) Effect of dietary Kaolin on the growth Performance and serum chemistry of broilers Nigeria Journal of Animal Science 13:96-102.

Oluyemi, J. A, and Roberts, F.A (2000) Poultry Production in Warm wet climates. Rev. Ed. Spectrum Books Limited Ibadan, Nigeria pp 244.

Sawsan A. O; Ebtesam M. A; Maha, H. E. Zeinab K. Hassan; Maha H.D. and Osama B. M. (2012) Experiment Cassia Senna Intoxication in Lohmann Broiler Chicks Journal of Medicinal Plants Research Vol. 6(17); 3306 – 3310.

Schrews F.J.G. (2000); Post Mortem Changes in Chicken Muscle World Poultry Science Journal. 53:319-346.

Steel; R.G. and Torrie, J.H. (1980) Principles and Procedures of Statistics, McGraw Hill Book Co. Inc. New York USA.

TADP (2004) Crop production recommendation for Taraba

state, government printing press, Jalingo, Nigeria, pp 31 – 40.

Yakubu and B. Alfred (2014) Nutritional Evaluation of wasted white sesame seed meal sesamum indicum as a source of Methionine on growth, performance, carcass characteristic, Hematological and Biochemical Indices of finisher Broiler chickens. 10SR Journal of Agriculture and Veterinary Science 7;(1) 46-52.