GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF BROILER CHICKENS FED DIETS SUPPLEMENTED WITH *Senna alata* LEAF MEAL

Yahaya, M.O, *Bolu, S.A and Awodola-Peters, O.O
Federal College of Animal Health and Production Technology, Moor Plantation, Oyo state
University of Ilorin, Ilorin Kwara State Nigeria
Corresponding author: mariamosikwe@yahoo.com +2348061387108

Abstract

A 42 -day feeding trial to evaluate the effects of dietary supplementation of *Senna alata* leaf meal on growth performance and carcass characteristics of broiler chickens. 200 day old Abor acre plus broiler chickens were used for the experiment in a completely randomized design. The birds were allotted into five dietary treatments of 40 birds each and were replicated five times with eight birds per replicate. Treatment 1 was the control, it had no dietary supplementation of *Senna alata* leaf meal. Treatment 2, 3, 4 and 5 had inclusion levels of 0.5, 1.0, 1.5 and 2.0g/kg dietary supplementation of *Senna alata* leaf meal respectively. Data were collected on feed intake and weight changes; feed conversion ratio was derived. At the end of the feeding trial, two birds per replicates were weighed and their carcass characteristics assessed and recorded as relatives of live weights. Data obtained were subjected to analysis of variance. Results of the experiment showed significant difference in the average daily weight gain with birds fed diets containing 1.0g/kg *Senna alata* leaf meal having the highest value of 43.68g/b/d while birds fed 2.0g/kg *Senna alata* leaf meal had the least value of 36.19g/b/d. There was also significant difference ($P<0.05$) with the birds fed diets containing 1.0g/kg having the highest value for eviscerated, breast, thigh and liver weights. It was concluded that the inclusion of *Senna alata* leaf meal as supplements in broiler diets aided positive growth performance and carcass characteristics of the broiler chickens.

Key words: *Senna alata, Broiler chickens, Weight changes, Dietary Supplementation**,** Carcass characteristics*

Introduction

Sourcing for alternative, nutritive and cheap source of ingredients is a veritable option to efficient broiler meat production especially in tropical countries as poultry feed accounts for about 70-80% total cost of production. Competition between humans and animals for available feed resources has led to a continuous rise in cost of feed ingredients (Agbakoba *et al*., 1995; Madubuike and Ekenyem, 2001).

Senna alata Linn locally known as "*asunwon oyinbo"* (Yoruba) in the western part of Nigeria, is a pan tropical ornamental shrub, belonging to *Caesal piniaceae*. It is commonly known as ringworm plant or Christmas bush and is widely distributed from tropical America to India (Ibrahim and Osman, 1995; Singh *e*t *al*., 1990). The leaf of *Senna alata* Linn has been reported to possess analgesic, antimicrobial, antitumor and antidiabetic properties (Somchit *et al*., 2003). The leaf is locally used in Nigeria in the treatment of several infections such as ringworm and parasitic skin diseases (Palanchamy *et al.*, 1990). *Senna alata* L. plants contain a group of phytochemicals like saponin, alkaloid, steroid, flavonoid, tannin and phenol (Akinyemi *et al*., 2000). Although there are reports on the use of the leaf, bark and flower of *Senna alata* for medicinal purposes, there is paucity of information on the use of this plant as supplement in poultry diet. The main objective of this research was to assess the response of broiler chickens to basal diets supplemented with *Senna alata* leaf meal.

Materials and methods

Experimental site: The experiment was carried out at the Experimental site of the Federal college of Animal Health and production technology Moor Plantation Ibadan.

Experimental animals and their management: 200 one day old un-sexed Abor acre broiler chickens were used for this experiment. The birds were raised on deep litter while feed and water was served *ad libitum* throughout the period of the experiment which lasted for six weeks.

Experimental treatments and design: The two hundred birds were allotted into five dietary treatments of forty (40) birds. Each treatment was replicated five times with eight (8) birds per replicate in a completely randomized design.

Sourcing of test ingredients and basal diets: *Senna alata* leaves were collected from Ijebu Ode in Ogun State, they were air dried and milled before incorporating into the feed**.** Treatment 1 was the

control, it had no dietary supplementation of *Seena alata* leaf meal. Treatment 2, 3, 4 and 5 had inclusion levels of 0.5, 1.0, 1.5 and 2.0g/kg dietary supplementation of *Senna alata* leaf meal respectively.

Data collection: Data was collected on the daily feed intake and weight changes, while the feed conversion ratio was derived.

Feed intake = Amount of feed served – Leftovers

Weight gained = Final weight –Initial weight

Feed conversion ratio = Feed intake/weight gained

At the end of the six weeks, two birds per replicate were selected and fasted for 12 hours before slaughtering them by severing the jugular vein. Live weights of the birds were taken before slaughtering, after slaughtering and bleeding, the bled weight was also recorded and records of the de feathered, eviscerated as well as different cut out parts of the birds were also weighed and recorded.

Statistical analysis: All data collected were subjected to analysis of variance using (SAS, 2005) and significant means were separated using Duncan's Rultiple Range Test (DMRT) of the same statistical package

RESULTS AND DISCUSSION

The results of growth performance of broiler chickens fed dietary *Senna alata* leaf based diets is presented in Table 1. It showed significant difference in values obtained for average daily weight gain ($P<0.05$), it was revealed that birds fed diets containing 2g/kg *Senna alata* had the least average daily weight gain (36.19g/b/d) and highest value of FCR (2.38). While other feed and growth parameters measured were not significantly different ($P> 0.05$). Reports of Sanjyal and Sapkota (2011) showed that inclusion of medicinal plant extracts in poultry diets impacted positively on the metabolism by reducing stress and microbial activity. Apart from control, there was progressive increase in the weight gained by the birds as the concentration of *Senna alata* in the feed increased up to 1.5g/kg of feed and there was a decrease in the weight gained by birds fed diets containing 2g/kg *Senna alata*. This result is in agreement with the work of Daramola (2019) who reported that herbs and their various combination (different herbs) improved the production indices and activities of digestive enzymes in broiler chicken. The observed increase in growth performance may also suggest increased secretion of digestive enzyme resulting in enhanced nutrition utilization in liver (Khan *et al*., 2012).

Table 1: Growth Performance of broiler chicken fed varying levels of dietary *Senna alata* leaf meal based diets.

Parameters	0g/kg	0.5g/kg	1.0g/kg	1.5g/kg	2.0g/kg	SEM
Initial weight (g/b)	43.42	43.47	40.02	39.97	39.87	0.34
Final weight (g/b)	2050.80	1952.00	1990.70	2125.50	1919.90	44.66
TFI (g/b)	4533.20	4172.60	4161.10	4530.30	4340.10	104.87
ADFI(g/b/d)	107.93	99.34	99.07	107.86	103.33	2.49
TWG (g/b)	2007.40	1908.50	1950.70	2085.50	1880.00	44.67
ADWG (g/b/d)	42.67^{a}	41.92^{a}	44.68^{a}	43.94^{a}	36.19^{b}	0.91
FCR	2.25	2.19	2.13	2.19	2.38	0.06

^{a,b,c} *means bearing different superscripts on the same row are significantly different ($p<0.05$); SEM :Standard error of mean. TFI: Total feed intake; ADFI: Average daily feed intake; ADWG: Average daily weight gain; TWG: Total weight gain; FCR: Feed conversion ratio*; *g/b: gram per bird; g/b/d: gram per bird per day*

The result for carcass analysis of broiler chickens fed diets supplemented with *Seena alata* leaf meal is presented in table 2. The result showed significant ($P<0.05$) differences in some parameters such as the eviscerated weight, breast, thighs, liver and bursa of fabricius. Birds on diets containing dietary inclusion level of 1g/kg *Seena alata* leaf meal of feed had the highest value of (82.09%) for the eviscerated weight while birds fed diets containing 0,0.5 and 1.5g/kg feed *Senna alata* were not statistically different. Birds fed diets containing 2g/kg feed *Senna alata* had the least value for eviscerated weight (71.34%). This same trend was noticed for the breast and thighs of the birds fed with 1.5g/kg feed *Senna alata* supplemented diet having the highest weights for the parts. This

showed that the presence of *Senna alata* at 1g/kg of feed had a positive effect on the growth of the breast parts and the thighs in the broiler chickens. The highest liver weight (2.57%) was observed for the control group which did not have the test ingredient in the feed of the birds. While the least values (1.75% and 1.89%) were observed for the birds with an inclusion level of 0.5g/kg of feed and 1.5g/kg of feed respectively. The bursa of fabricius also showed significant difference ($P<0.05$) with similarities in birds fed diets containing 0 and 1.5g/kg of feed (0.07%) as well as birds fed diets containing 0.5 and 1.0g/kg *Senna alata* with values between 0.04-0.05%. Birds on diets containing 2.0g/kg feed *Senna alata* had the highest value of 0.14g. Birds have central and peripheral lymphoid tissues, which play an important role in the body defence against pathogens. The immune organ index is expressed in terms of increase in sizes of thymus, bursa of fabricius and spleen (Kr´oliczewska *et al*., 2017; Raphael *et al*., 2015). The percentage weights of the bursa of fabricius for the control and diets supplemented with 1.5 and 2.0g/kg *Senna alata* showed possible enlargement which may be due to reaction to phytochemical compounds present in the leaf meal while birds on diets containing no test ingredient and 0.5g/kg of the test ingredient showed no trace of possible infection and the presence of a repressed bursa.

Table 2: Carcass Characteristics of broiler chicken fed dietary *Senna alata* leaf.

Parameters	0g/kg	0.5g/kg	1.0g/kg	1.5g/kg	2.0g/kg	SEM
Live weight (g)	1452.00	1670.00	1770.00	1782.00	1546.00	63.54
Bled weight (%)	95.64	92.93	96.56	93.64	89.45	1.37
Defeathered weight (%)	91.24	88.07	93.13	87.91	86.38	1.44
Eviscerated weight (%)	77.24^{ab}	76.86^{ab}	82.09^{a}	77.49^{ab}	71.34^{b}	1.39
Carcass weight (%)	65.16	64.73	70.39	53.74	59.94	2.69
Breast (%)	20.17^{bc}	23.14^{ab}	24.16^{a}	23.13^{ab}	19.22^{c}	0.61
Drumstick (%)	10.24	10.35	10.37	9.89	9.66	0.21
Thigh (%)	11.52^{ab}	11.26^{ab}	12.39^{a}	11.33^{ab}	10.39^{b}	0.26
Back (%)	14.05	12.06	13.25	12.42	12.21	0.31
Wings (%)	8.79	8.23	8.51	7.92	7.91	0.15
Shank (%)	4.32	5.03	3.96	3.68	3.72	0.28
Head (%)	2.89	2.35	2.32	2.32	2.61	0.09
Proventiculus (%)	0.58	0.49	0.47	0.48	0.49	0.02
Whole gizzard (%)	3.00	2.34	2.48	2.58	2.74	0.11
Empty gizzard (%)	2.18	1.79	1.81	1.91	1.85	0.06
Liver (%)	2.57^{a}	1.75^{b}	2.08^{ab}	1.89^{b}	2.03^{ab}	0.09
Heart (%)	0.59	0.52	0.52	0.51	0.57	0.02
Lung (%)	0.62	0.48	0.53	0.52	0.51	0.02
Neck (%)	5.24	4.73	4.91	4.64	4.34	0.14
Bursa of Fab. (%)	0.07^{ab}	0.05^{b}	0.04^{b}	0.07^{ab}	0.14^{a}	0.01
Thymus (%)	0.22	0.33	0.35	0.42	0.47	0.05
Abdominal fat (%)	0.89	0.89	1.90	1.18	1.86	0.21
Intestinal wt (%)	5.16	5.55	5.24	5.03	6.36	0.43
Intestinal length (%)	11.51	10.84	12.35	12.85	10.26	0.59
Ceacal length (%)	1.09	1.16	1.14	1.21	0.76	0.51
Spleen (%)	0.15	0.10	0.11	0.12	0.15	0.01

^{a,b,c} means bearing different superscripts along the same row are significantly different ($P<0.05$); SEM :Standard error of mean.

CONCLUSION

The inclusion of *Senna alata* leaf meal as supplements in broiler diets aided positive growth performance and carcass characteristics of the broiler chickens especially from 0.5 - 1.5g/kg inclusion levels.

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