
GROWTH PERFORMANCE AND SERUM BIOCHEMICAL INDICES OF BROILER CHICKEN AS INFLUENCED BY DIETARY INCLUSION OF *PICRALIMA NITIDA* SEED MEAL.

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ABSTRACT

The use of natural feed additives in poultry industry cannot be overemphasized. Thus a 6 weeks trial was conducted to evaluate the effect of dietary *Picralima nitida* seed meal (PNSM) as substitute to antimicrobial feed additives on the growth performance and serum biochemical indices of broiler chickens. A total of 256 one-day-old, unsexed Arbor-Acre Plus broiler chicks were randomly allotted into four dietary treatments, replicated eight times with eight birds in a completely randomized design. PNSM was incorporated into the experimental diet at varying levels; 0, 0.25, 0.50 and 1.0 g/100g. Feed and water were offered ad-libitum to the birds for six weeks. Data collected on growth performance and serum biochemical indices were subjected to one-way analysis of variance. Results indicated that dietary PNSM inclusion level significantly ($p < 0.05$) influenced weight gain positively with birds fed 0.5% PNSM having the highest weight gain (1837.43g). However, the addition of PNSM in the broiler diets did not affect serum biochemical indices (liver enzymes, electrolytes and serum lipids) significantly ($P > 0.05$). Total cholesterol ($P = 0.053$) and low-density lipoprotein ($P = 0.094$) levels increases at 0.5% inclusion of PNSM when compared with the control. The supplementation did not significantly ($P > 0.05$) affect serum antioxidant content (total phenols and total flavonoids). It can be concluded that PNSM supplemented at 0.5% in the diets of broiler chicken improved weight gain, better feed conversion ratio and improved the chicken's serum antioxidants.

Keywords: Herbs, Growth Promoters, Additives, secondary metabolites,

INTRODUCTION

The low consumption of animal protein in most third world nation (WHO, 2018) is no longer a subject of debate but the quality of the livestock product produced. The quality of the livestock product reflects the feedstuff fed into the animal to yield it. The ban on the use of antibiotic growth promoters (Brown *et al.*, 2017) have helped a great deal in the production of less drug residual effect livestock products (Mafimidiwo *et al.*, 2021). Meanwhile, the importance of antimicrobial feed additives in livestock feed or water to control diseases, infection and pest infestation cannot be overemphasized (Adegun *et al.*, 2020). Research have revealed that a number of the synthetic antimicrobial feed additives were herbs products with same effect as its sources (Onyeaka and Nwambueke, 2007). The incessant increasing cost per kilogram of meat is determined by the cost of feed and also medicament of which these seldom imported antimicrobial feed additives are inclusive. Recently, the dollar to naira exchange rate in Nigeria has further compounded the matter. It is therefore of necessity that research should evolve herbal plants part (Oyeleke *et al.*, 2021) or their extract (Olayemi *et al.*, 2017) as alternative to the synthetic antimicrobial additives that can boost animal performance. Among such plant is *Morinda lucida* (Olayemi *et al.*, 2016, *Viola odorata* (Olayemi *et al.*, 2017), *Petiveria alliacea* (Guinea Hen Weed) (Sobayo *et al.*, 2018). Broiler chicken is one of the fastest meat producers globally (FAO, 2016) and capable of yielding appreciable quantity of meat within a short period of time. Most commercial broilers reach slaughter weight at between

five and seven weeks of age (Wong *et al.*, 2004). Notwithstanding this good attribute, the production and performance of this chicken can further be enhanced with adequate feed additives. *Picralima nitida* is popularly called Akuamma in West Africa and Abeere in Southern Nigeria. It is known for its anti-inflammatory effect on human, it is often used in the treatment of cancer, malaria and diabetes (De Campos *et al.*, 2020) as well as an antidote for dysmenorrheal and gastrointestinal disorders (Erharuyi *et al.*, 2014). *Picralima nitida* seed powder contains 13.92 ± 5.23 % crude protein, 7.15 ± 4.26 crude fiber, 6.82 ± 3.74 ash and 58.09 ± 5.27 nitrogen free extract (Haruna and Odunsi, 2022). The report of Nwaogu (2016) revealed that the seeds contain both vitamin A ($3285.70 \mu\text{g}/100\text{g}$) and E ($123.40 \mu\text{g}/100\text{g}$) even though they are in low concentration but are associated with reproduction and performance of the body. The uses of the leaves have been well documented (Erharuyi *et al.*, 2014). The leaf is rich in secondary metabolites and some important anti-nutritional properties (Haruna and Odunsi, 2022) whereas the effectiveness of the seed still remains poorly investigated. Therefore, this study attempted at the utilization of *Picralima nitida* seed meal as a feed additive in the diets of broiler chicken.

Experimental Site and preparation

The research was carried out at the Teaching and Research Farm, Faculty of Agriculture, University of Ibadan, Oyo State, Nigeria on longitude $7^{\circ}26'85^{\circ}\text{N}$ and latitude $3^{\circ}53'55^{\circ}\text{E}$ (Google Earth 2023) lying in the green Savanah zone of Nigeria. Prior to the commencement of the experiment, twelve pens were cleaned and disinfected and allowed to rest for two weeks to reduce the microbial load in the poultry house.

Preparation of test ingredient

Dry seeds of *Picralima nitida* were obtained from traditional medicine material market at Ojoo, in Ibadan, Oyo State, Nigeria. They were hand-picked to eliminate pebbles, weighed and milled using 2mm sieve and kept in a polythene bag until usage. It was later incorporated into the experimental diet (Table 1).

Table 1: Gross composition of experimental diets (g/100gDM)

Ingredients (g/100g)	Inclusion levels of <i>Picralima nitida</i> (g/100g)			
	T1 (0.00)	T2 (0.25)	T3 (0.50)	T4 (1.00)
Maize	63.3	63.05	62.80	62.30
Broiler Premix	0.25	0.25	0.25	0.25
Soya Bean Meal	29	29	29	29
Soya oil	3.5	3.5	3.5	3.5
Di-Calcium Phosphate	1.8	1.8	1.8	1.8
Limestone	1.6	1.6	1.6	1.6
Methionine	0.18	0.18	0.18	0.18
Lysine	0.12	0.12	0.12	0.12
Salt (NaCl)	0.25	0.25	0.25	0.25
Picralima nitida seed meal (PNSM)	0	0.25	0.5	1.0
TOTAL	100	100	100	100
Calculated Analysis				
ME (Kcal/Kg)	3070	3069	3067	3062
Crude Protein (%)	19.37	19.29	19.24	19.20
Crude fiber (%)	0.99	1.04	1.07	1.09
Ether Extract	0.47	0.46	0.46	0.45

Experimental and management Birds

256 pieces of one-day old (Arbor-Acre Plus) broilers that were purchased from Federal College of Animal Health and Production Technology, Ibadan, Oyo State, Nigeria were randomly allotted into four dietary treatments after stabilization with eight chicks in each of the three replicates in a treatment. The treatment had *Picralima nitida* seed meal (PNSM) incorporated as T1 (Control= 0% PNSM), T2= 0.25%, T3= 0.5%, and T4= 1.0% PNSM inclusion levels. Experimental diets were fed to

the chicks liberally for 56 days and cool clean water were offered *ad libitum* to the birds throughout. At the end of the trial, data were collected on growth parameters (Table 2) and serum chemistry (Table 3) and were subjected to analysis of variance in a completely randomized design using SAS 2000. The significant means were separated using Duncan multiple range test.

Results and discussion

The growth performance reveal that the final weight and daily weight gain were significantly ($p < 0.05$) affected by the treatment with a higher (1900.15g) final weight observed on birds fed 0.5% *Picralima nitida* seed meal inclusion and higher daily weight gain (43.75g) was recorded on same T3. The total feed intake, daily feed intake and feed conversion ratio were not significantly ($p > 0.05$) affected by the treatment. Similarly, the best FCR (1.59) was observed on T3. The serum indices results showed that all the parameters observed except cholesterol were not significantly ($p > 0.05$) affected by the treatment. However, the highest value for cholesterol (196.50), High-density lipoprotein (HDL) and Low-density lipoprotein (LDL) (134.63 and 44.90 mg/dl) respectively were observed in birds on T3. Similarly, the highest (2.53mg/dl) albumin, highest value of AST (202.50iu/l), ALT (36.13iu/l and ALP 390.88iu/l were observed in birds fed 0.5% *Picralima nitida* supplemented diet (Table 3).

Table 2: Effect of *Picralima nitida* based diet on the growth performance of broiler chicken

Parameters (g)	Inclusion levels of <i>Picralima nitida</i> (g/100g)				SEM	p-value
	T1 (0.00)	T2 (0.25)	T3 (0.50)	T4 (1.00)		
Initial weight	61.94	63.32	61.96	62.22	0.71	0.901
Final weight	1682.83 ^b	1774.86 ^{ab}	1900.74 ^a	1679.18 ^b	28.38	0.011
Weight gain	1620.89 ^b	1712.91 ^{ab}	1837.43 ^a	1616.96 ^b	28.32	0.011
Daily weight gain	38.59 ^b	40.78 ^{ab}	43.75 ^a	38.50 ^b	0.67	0.011
Total feed intake	2879.90	2875.30	2919.80	3342.00	126.19	0.510
Daily feed intake	68.50	68.49	69.52	79.57	3.00	0.510
Feed conversion ratio	1.78	1.69	1.59	2.08	0.17	0.162

^{a,b,c} Means in the same row with different superscripts are significantly different ($P < 0.05$). S.E.M= standard error mean.

Table 3: Effect of *Picralima nitida* diets on the Serum indices of broiler chicken

Parameters	Inclusion levels of <i>Picralima nitida</i> (g/100g)				SEM	p-value
	T1 (0.00)	T2 (0.25)	T3 (0.50)	T4 (1.00)		
Total Protein (mg/dL)	7.85	7.80	8.65	7.88	0.16	0.189
Albumin (mg/dL)	1.85	1.70	2.53	1.86	0.14	0.154
Globulin (mg/dL)	6.00	6.10	6.13	6.01	0.06	0.828
Albumin/Globulin	0.27	0.28	0.41	0.30	0.02	0.122
BUN (mg/dL)	2.83	2.74	3.36	2.75	0.13	0.265
Creatinine (mg/dL)	0.65	0.66	0.76	0.64	0.02	0.113
Cholesterol (mg/dL)	185.88 ^b	182.50 ^b	196.50 ^a	184.88 ^b	1.99	0.053
Triglycerides (mg/dL)	76.38	70.13	84.88	68.00	4.14	0.492
HDL (mg/dL)	133.00	131.00	134.63	134.13	0.94	0.554
LDL (mg/dL)	37.60	37.48	44.90	37.15	1.30	0.094
AST (iu/L)	186.50	188.75	202.50	192.25	2.56	0.122
ALT (iu/L)	33.25	32.13	36.13	30.88	1.31	0.550
ALP (iu/L)	356.50	362.75	390.88	359.88	8.02	0.442

a,b, Means along the same row with different superscripts are significantly different ($P < 0.05$). S.E.M. - standard error mean. BUN: Blood Urea Nitrogen, HDL: High Density Lipoprotein, LDL: Lower Density Lipoprotein, AST: Aspartate Aminotransferase, ALT: Alanine Aminotransferase, ALP: Alkaline Phosphatase

CONCLUSION AND RECOMMENDATION:

The study showed that 0.5% PNSM can be incorporated into broiler chicken diets for better feed conversion ratio and serum indices and it is hereby recommended.

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