

USE OF *ANDROPOGON TECTORUM* AS A LEAF MEAL FOR FINISHER BROILER DIET: A PANACEA TOWARDS ENHANCEMENT OF PRODUCTIVITY AND SUSTAINABILITY

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Abstract

The high cost of conventional feed ingredients has necessitated the need to explore alternative feed ingredients in feeding of broiler chickens. This trial was conducted to investigate the performance of finisher broiler chickens fed dietary inclusions of *Andropogon tectorum* leaf meal (ATLM). 120 Anak-2000 strain of finisher broilers were distributed randomly in a completely randomized design (CRD) of four treatments, each replicated three times. The experimental diets consist of ATLM included at levels of 0.0, 2.5, 5.0 and 7.5% in treatments 1 (control), 2, 3 and 4 respectively. The diets were fed for 28 days, during which feed intake and weight gain and mortality were monitored. Broilers in T₃ had the highest final weight gain of 2141.67 which although was significantly ($P < 0.05$) higher than the control (1836.67g) but was similar with T₂ and T₄. The daily weight gain was best for T₂ broilers and similar with T₃ broilers. The feed conversion ratio was best among chickens in T₂ and T₃ while feed intake did not differ among the groups. It was concluded that up to 5% inclusion rate of ATLM can increase the productivity of finisher broiler chickens and therefore recommended.

Key words: *Andropogon tectorum*; Diet; Finisher broiler chicken; Performance

Description of problem

The current practices in Nigerian livestock farming calls for transformation towards seeking better ways to enhance livestock productivity and sustainability in the face of global challenges of climate change and environmental degradation. Presently, Nigeria ranks very low in daily protein intake with per capita consumption levels of 8.7 litres of milk, 9 kg of meat and 45 eggs per year compared to global averages of 44 litres of milk, 19 kg of meat and 180 eggs (1). One of the greatest challenges contributing to the poor intake of animal products is the high cost of feeding which accounts for 65-75% of the total production cost in an intensive livestock production system (2). This has raised the cost of animal production, leading to skyrocketed market prices and low affordability. To avert this situation, efforts have been made towards the use of alternative feed ingredients by

incorporation of agro-industrial by-products including the use of leaf meals to reduce the cost of feed in broiler diets (3). The use of leaf meal as alternative feed ingredient is gradually gaining recognition in broiler production. One of the leaves of interest is *Andropogon tectorum* commonly called Silver Bluestem grass or southern gamba grass. The grass is a tropical species that is widely distributed in Nigeria and has been reported to have potential as a feed ingredient (4). This nutritional quality makes it an attractive option for animal feed (5). Also, the dense stands of dry gamba grass constitute fuel reserves that can yield intense fires in the late dry season (6). It then means that harvesting the gamba grass and processing it into leaf meal or hay or silage could not only be advantageous as alternative feed ingredient for enhancement of livestock productivity, but also a panacea to bush burning and its environmental consequences during the late dry

season. This research explored the effect of dietary inclusion of *Andropogon tectorum* leaf meal on the performance of finisher broiler chickens.

Materials and Methods

The research was conducted at the Teaching and Research Farm, Department of Animal Health and Production Technology, Akanu Ibiam Federal Polytechnic, Unwana, Afikpo, Ebonyi State. Unwana is in the tropical rain forest zone of Nigeria.

Collection and preparation of the *Andropogon Tectorum* leaf

The *Andropogon tectorum* grass used for the study was harvested before the flowering stage from the Pasture Unit of Akanu Ibiam Polytechnic, Uwana. The harvested grass was chopped into pieces and oven dried. The dried leaves were milled to obtain the *Andropogon tectorum* leaf meal (ATLM). The sample was analyzed according to (7), to obtain its chemical composition and was used afterwards to

substitute Brewers dried grain at different levels.

Experimental Birds and Design

A total of 120 Anak 2000 strain of finisher broilers of 28 days post hatch were randomly assigned to four (4) treatment groups in a complete randomized design (CRD) and replicated 3 times. The groups were T₁ which was the control group, T₂, T₃ and T₄. The birds were raised in a deep litter system adopting strict bio-security measures and ethical standard. Feed and water were given *ad-libitum* for 28 days.

Experimental Diets, data collection and analyses

Four experimental diets were formulated for this research. Diet T₁ was the control which contained 0% ATLM, in diets T₂, T₃ and T₄, ATLM partly replaced brewer's dried grain and was added at 2.5%, 5.0% and 7.5% inclusion rates respectively. The percentage ingredient and the calculated nutrient composition of the experimental diets are shown in Table 1.

Table 1. Ingredient and calculated nutrient composition of the experimental diets

Ingredients	Treatment levels (%)			
	T ₁ (0.0ATLM)	T ₂ (2.5ATLM)	T ₃ (5.0ATLM)	T ₄ (7.5ATLM)
Maize	60.00	60.00	60.00	60.00
GNC	10.00	10.00	10.00	10.00
Soya bean meal	5.00	5.00	5.00	5.00
Brewers dried grain	10.00	7.50	5.00	2.50
AT Leaf meal	0.00	2.50	5.00	7.50
Palm kernel cake	5.00	5.00	5.00	5.00
Fish meal	3.00	3.00	3.00	3.00
Blood meal	2.00	2.00	2.00	2.00
Bone meal	4.00	4.00	4.00	4.00
*Min-vit premix	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25
Common salt	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00
Calculated nutrient composition of the diets				
Crude protein (%)	19.27	18.79	18.24	17.73
Crude fibre (%)	4.12	4.51	4.90	5.28
Calcium (%)	1.62	1.62	1.63	1.63
Crude fat (%)	4.83	4.68	4.51	4.36
**Met. Energy (kcal/kg)	2963	2915.17	2867.51	2819.86

*To provide the following per kilogram of feed, vit A 10,000 IU; Vit D3 1,500 IU, Vit E 2mg; riboflavin 3mg; pantothenic acid 10mg; nicotinic acid, 2.5mg; choline 3.5mg; folic acid 1mg; magnesium 56g; lysine 1mg; iron 20mg; zinc 50mg; cobalt 1.25mg. **Calculated using the formular $ME = 37 \times CP + 81.8 \times EE + 35.5 \times NFE$ (where ME= metabolizable energy, CP= crude protein, EE=ether Extract and NFE = Nitrogen free extract) (8).

Data collection

Data were collected by re-weighing the birds to obtain their final body weight and daily weight

gain. Feed intake was obtained by deducting the leftover feed from the quantity of feed given. Feed conversion ratio (FCR) was calculated by

dividing mean feed intake with mean weight gain. Data obtained were subjected to analysis of variance (ANOVA). Treatment means were compared using Duncan Multiple Range test at an α -level of 0.05% significant level.

Results and Discussion

The result of the performance of the finisher broiler chickens fed graded levels of *Andropogon tectorum* leaf meal is presented in Table 2. The result showed that the final weight of the broilers in T₃ group (2141.67 grams) was similar ($P>0.05$) to T₂ (2083.67gm) and T₄ (2004.33gm) but higher ($p<0.05$) than the control group (1836.67gm), an indication that the broilers utilized the *Andropogon tectorum* leaf meal at those inclusion levels favorably better than only brewer's dried grain to develop

their body muscles as indicated by (9). The average daily weight gain however, was highest for broilers in T₂(36.71) and T₃ but started poorer in T₄. This could be an indication that high inclusion rate of the leaf meal could result to negative consequences as opined by (10) who reported that presence of antinutritional factors in leaf meals can have negative effect on nutrient digestibility and utilization when included in the diet at a high rate. The decline in weight of the broilers is then suggestive that 5% inclusion rate (T₃) could be the optimal inclusion rate. No mortality was recorded in the course of the research an indication that inclusion of *Andropogon tectorum* leaf meal at up to 7.5% inclusion rate is not deleterious to the chickens.

Table 4.2 Performance of finisher broilers fed graded levels of *Andropogon tectorum* leaf meal

Parameters	Treatment levels (%)				SEM
	T ₁ (0.00ATLM)	T ₂ (2.50ATLM)	T ₃ (5.00ATLM)	T ₄ (7.50ATLM)	
Av. Initial wt (g)	981.67	1129.17	1241.67	1137.50	165.65
Av. Final wt (g)	1836.67 ^b	2083.67 ^{ab}	2141.67 ^a	2004.33 ^{ab}	122.32
Av. Body wt gain (g)	849.67	954.50	900.00	866.83	98.44
Av. Daily wt gain (g)	33.14 ^{ab}	36.71 ^a	34.61 ^a	29.30 ^b	1.83
Av. Total feed intake (g)	3805.27	4076.02	4042.22	4346.85	358.28
Av. Daily feed intake (g)	146.42	156.77	155.47	167.19	13.77
Feed conversion ratio	4.42 ^a	4.31 ^a	4.51 ^a	5.67 ^b	0.46
Mortality (No)	0	0	0	0	

Note: Means on the same row with different superscript differ significantly. Without superscript = not significant ($P<0.05$). SEM = Standard error means.

Conclusion and Application

From the findings of the present research, the following conclusion were made:

1. Inclusion of *Andropogon tectorum* leaf meal at up to 5% in the diet of finisher broiler chicken improved the weight gain and productivity of finisher broiler chickens.
2. At up to 7.5% inclusion rate of *Andropogon tectorum* leaf meal in the diet of finisher broiler chickens, no deleterious effect occurred.
3. Inclusion of *Andropogon tectorum* leaf meal to finisher broiler chicken's diet yielded better productivity and therefore application at up to 5% inclusion rate recommended.

References

- [1]. NIAS, (2024). Newsletter publication of Nigerian Institute of Animal Science (NIAS). Volume 11. No 5.
- [2]. Aderemi, F. (2020). Sustainability of Animal Protein Production: Means to promote food Security being the 6th Inaugural Lecture of Bowen University Iwo October 2020 Nigeria pp1- 60.
- [3]. Sugiharto, S. (2019). A review on fungal fermented cassava pulp as a cheap alternative feedstuff in poultry ration. *Journal of World's Poultry Research*, 9, 01-06.
- [4]. Adebawale, A. A., Adedeji, A. A. and Oyedeji, K. A. (2016). Evaluation of *Andropogon tectorum* leaf meal as a protein

supplement in broiler chicken diets. *Journal of Animal Science and Technology*, 68(2), 257-265.

[5]. Ojo, F. M. (2023). Forage Nutritional Properties of Four Accessions of *Andropogon gayanus-Andropogon tectorum* In South Western Nigeria. *Coast, J. Sch. Sci.* 5 (1): 835 – 849.

[6]. Csurhes, S. and Edwards, R. (1998). Potential environmental weeds in Australia: Candidate species for preventative control. Canberra, Australia. Biodiversity Group, Environment Australia.

[7]. A.O.A.C. (2016). (Association of Official Analytical Chemists). Official methods of analysis (18th ed.). A.O.A.C International Virginia, USA.

[8]. Pautenga, U. (1985). Feeding parent stock. *Zootecnia International* Pp 22-25.

[9]. Mariana, R. A., Cecilia, J. P., Carlos, J. W., Jesús, R. G., Alejandro, Á. E. and David, S. C. (2018). Inclusion of the *Moringa oleifera* leaf on immunological constants in broiler chickens. *Abanico Veterinario*, 8, 68-74.

[10]. Buragohain, R. (2018). Growth performance, nutrient utilization, and feed efficiency in broilers fed *Tithonia diversifolia* leaf meal as substitute of conventional feed ingredients in Mizoram. *Veterinary World*, 9:444-449.