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## GROWTH RESPONSE OF FUNAAB ALPHA BROILER CHICKENS TO DIETS CONTAINING VARYING LEVELS OF ALLIGATOR PEPPER (*AFRAMOMUM MELEGUETA*) SEED MEAL

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### ABSTRACT

Alligator pepper (*Aframomum melegueta*) seed meal (APSM) was used as an alternative growth promoter in diets of FUNAAB Alpha broiler chickens. One hundred and fifty (150) 1-day-old chicks were arranged in a Completely Randomized Design into five treatment groups, three replicates per treatment with ten birds per replicate. The birds were fed basal diet containing APSM at 0, 0.5, 1.0, 1.5 and 2.0 g/kg for the 8 weeks experimental duration. Data were collected on feed intake (FI), weight gain (WG), and feed conversion ratios (FCR) were calculated for both phases of growth of broiler chicken. Results revealed that dietary inclusion of Alligator pepper significantly ( $p < 0.05$ ) influenced final weight, weight gain and FCR of broiler chicken at chicks' phase. While at finisher phase, the growth indices were comparable across all treatment groups. The study therefore concluded that dietary inclusion of 0.5, 1.0 or 1.5g/kg APSM relatively enhanced the weight gain of finisher FUNAAB Alpha broiler chickens.

**Keywords:** Alligator pepper, broiler chickens, growth indices, seed meals

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### INTRODUCTION

Restriction on the use of direct-feed antibiotics as growth promoters in livestock in many countries has fuelled the search for alternative products like phytochemical feed additives (a group of plant-derived products), which have been reported to improve growth performances in farm animals, with no residual effect unlike in-feed antibiotics growth promoter which has become a major community health concern with limiting effect in the poultry industry due to their residues in tissues of the birds. Alligator pepper seed meal (APSM) with its growth promoting properties could be considered as potential key solutions for antibiotic-free livestock nutrition, due to its anti-oxidizing, antimicrobial, digestion stimulating properties, and it's used in treating gastrointestinal disorders (Doherty *et al.*, 2010; Alaje *et al.*, 2014). While there is some information available regarding the use of APSM as phytochemical feed additives in the diets of other strains of broiler chickens, its specific application in FUNAAB alpha broiler chickens' diets is quite scarce. Therefore, the study aims to evaluate the performance responses of FUNAAB alpha broiler chickens to diets containing varying levels of APSM.

### MATERIALS AND METHODS

The study was carried out at the Poultry Unit of the Directorate of University Farms (DUFARMS), Federal University of Agriculture, Abeokuta (FUNAAB), Ogun State, Nigeria. The area lies on latitude 7° 13'49.46N and longitude 3°26'11.98E, at 76m above sea level in a tropical rain forest vegetation zone with an average temperature of 27.57°C (Google Earth, 2022). Dried Alligator pepper was purchased from open market within Abeokuta metropolis; the seeds were removed from its pods and blended using a kitchen blender to achieve a fine particle size and included in the basal diets at 0.0, 0.5, 1.0, 1.5 and 2.0 g/kg basal diets to form five dietary treatments, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub> respectively. One hundred and fifty (150) day-old FUNAAB Alpha broiler chicks were purchased from a FUNAAB Hatchery at DUFARMS, FUNAAB and randomly allotted to five dietary treatments (T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub>) in a completely randomized designed of three replicates with ten chicks per replicate. Experimental diets and water were provided *ad libitum* throughout the 28 days feeding trial. At the end of the feeding trial, records of live weight and feed intake for each replicate were used to calculate the average live weight per bird while feed conversion ratio was calculated as total feed consumed per weight gain. Data generated from the experiment were subjected to Analysis of

Variance for a Completely Randomized Design using general linear model of SPSS, (2021). Significant means were separated using the Duncans Multiple Range Test of SPSS software.

**Table 1: Gross composition of basal diet**

Ingredients (%)	Broiler Starter (0-4 weeks)	Broiler Finisher (5-8 weeks)
Maize	52	56
Soybean meal	22	8
Groundnut cake	10	16
Wheat offal	6.3	3
Palm kernel cake	2	9.3
Fish meal (72%)	3	3
Bone meal	2	2
Limestone	2	2
*Broiler Premix	0.25	0.25
Salt (NaCl)	0.25	0.25
Lysine	0.1	0.1
Methionine	0.1	0.1
<b>Total</b>	<b>100</b>	<b>100</b>
<b>Determine Nutrients (%)</b>		
ME Kcal/kg)	2933.80	2875.60
Crude Protein	23.22	20.18
Crude Fibre	4.26	5.12
Fat	2.19	4.12
Calcium	1.40	1.65
Phosphorus	0.44	0.82

\*Premix provided the following: Vitamin A 12,000,000 I.U; Vitamin D 3,000,000 I.U; Vitamin E 30,000,000; Vitamin K 2,500mg; Folic acids 1,000mg; Niacin 40,000mg; Panthothenic acid 10,000mg; Vitamin B12 20mg; Selenium 250mg; Iodine 200mg; Iron 40,000mg; Manganese 70,000mg; Copper 8,000mg; Zinc 60,000mg; Chlorine 200,000mg  
ME (Kcal/kg) = 37 x % CP + 81.8 x % EE + 35.5 x % NFE (Pauzenga, 1985)

## Result and DISCUSSION

Final weight, weight gain and feed conversion ratio of starter broiler chicks were significantly ( $p < 0.05$ ) influenced by dietary inclusion of alligator pepper seed meal (Table 2). Final weight of the chicks decreased significantly ( $p < 0.05$ ) with increasing dietary inclusion levels of alligator pepper.

Table 2: Growth performance of starter FUNAAB Alpha broiler chickens fed diets containing varying levels of APSM

Parameters/Inclusion level	0	0.5	1.0	1.5	2.0	SEM	P-value
Initial weight (g/bird)	41	40	40.5	40.3	40	0.57	0.89
Final weight (g/bird)	506.67 <sup>a</sup>	452.20 <sup>ab</sup>	385.20 <sup>bc</sup>	315.70 <sup>c</sup>	346.67 <sup>bc</sup>	23.21	0.02
Weight gain (g/bird)	466.67 <sup>a</sup>	412.20 <sup>ab</sup>	345.20 <sup>bc</sup>	275.70 <sup>c</sup>	306.67 <sup>bc</sup>	23.21	0.02
Weight gain (g/bird/day)	16.67 <sup>a</sup>	14.72 <sup>ab</sup>	12.33 <sup>bc</sup>	9.85 <sup>c</sup>	10.95 <sup>bc</sup>	0.83	0.02
Feed intake (g/bird)	1178.33	1211.48	1159.30	1244.81	1167.22	20.96	0.74
Feed intake (g/bird/day)	42.08	43.27	41.40	44.46	41.69	0.75	0.74
Feed conversion ratio	2.52 <sup>c</sup>	3.16 <sup>bc</sup>	3.36 <sup>abc</sup>	4.51 <sup>a</sup>	3.90 <sup>ab</sup>	0.21	0.03
Mortality (%)	0.00	7.41	3.70	7.41	3.70	1.45	0.51

<sup>a, b, c</sup> Means with different superscripts on the same row are significantly different ( $P < 0.05$ )

The weight gain also decreased significantly ( $p < 0.05$ ) with increasing dietary inclusion levels of alligator pepper up to 1.5% and the increased at 2% inclusion level. The best feed conversion ratio of the starter broiler chicks was obtained in birds on diet that had no inclusion level of alligator pepper. The decreased final weight and weight gain of the chicks with increasing dietary inclusion level of alligator pepper could be attributed to higher tannin and alkaloids contents of the seed as enthused by Doherty et al. (2010). The authors inferred that the high tannin content could be responsible for the

hot, bitter and pungent taste of alligator pepper. Also, Okwo and Okwo (2004) also reported that alligator pepper has a stringent property. Also, Enemor *et al.* (2014) asserted that although alkaloids are physiologically and pharmacologically useful, but some have deleterious effects that could lead to growth retardation in farm animals. Hence, the lower final weight and weight gain as recorded in this study points to the inability of the young chicks to handle high tannin and alkaloids contents of the alligator pepper.

Alligator pepper seed meal did not significantly ( $P > 0.05$ ) affect the growth performance of finisher FUNAAB Alpha broiler chickens, but numerically increased the weight gain of birds on dietary inclusion of alligator pepper seed meal at 1.5 and 2.0 g/kg and also numerically decreased the feed conversion ratios of the birds on the same dietary treatments (Table 3). The non-significant values in growth indices of the finisher broiler chickens indicates that despite the carryover effects observed in

Table 3: Growth performance of finisher FUNAAB Alpha broiler chickens fed diets containing varying levels of APSM

Parameters/inclusion level	0	0.5	1.0	1.5	2.0	SEM	P-value
Initial weight (g/bird)	506.67 <sup>a</sup>	452.20 <sup>ab</sup>	385.20 <sup>bc</sup>	315.70 <sup>c</sup>	346.67 <sup>bc</sup>	23.21	0.02
Final weight (g/bird)	1426.67	1513.71	1482.43	1538.13	1363.33	33.05	0.51
Weight gain (g/bird)	920.00	1061.51	1097.23	1222.43	1016.67	45.32	0.33
Weight gain (g/bird/day)	32.86	37.91	39.19	43.66	36.31	1.62	0.33
Feed intake (g/bird)	3367.39	3603.72	3097.29	3347.26	3325.36	72.46	0.32
Feed intake (g/bird/day)	120.26	128.70	110.62	119.54	118.76	2.59	0.32
Feed conversion ratio	3.69	3.58	2.87	2.74	3.34	0.18	0.38
Mortality	0.00	7.41	3.70	7.41	3.70	1.45	0.51

<sup>a, b, c</sup> Means with different superscripts on the same row are significantly different ( $P < 0.05$ )

the starting phase in terms of growth parameters point to the fact that chickens were able to adapt to the phytonutrients in alligator pepper. This observation confirms the findings by Debnath *et al.* (2014), which reported that natural feed additives improve performance and reduce mortality of broiler chickens. The result also revealed that birds on 1.5 g/kg and 2.0 g/kg dietary inclusion of alligator pepper seed meals had a numerically lower feed conversion ratio, this reaffirmed the report of Jacela *et al.* (2010) and ToshiWati *et al.* (2015) that phytogetic feed additives improve performance of livestock and poultry. Higher weight gain was observed in T4 birds while T2, T3 and T5 birds had statistically similar weight but better than T1 birds. This is in agreement with the findings of Farman *et al.* (2019), which reported an increase in weight gain of broiler when fed *Trigonella foenum graecum*.

## CONCLUSION

APSM improved final weight, weight gain and feed conversation ratio of starter FUNAAB Alpha broiler chickens fed 1.5gkg<sup>-1</sup> APSM based diet. While at finisher phase, the chickens were able to compensate for the lower weight gain as indicated by the non-significant growth parameter values. Hence, it can be adopted as management tool to enhance the growth of broiler chickens at finisher phase.

## REFERENCES

- Alaje, D.O., Owolabi, K.T., Olakunle, T.P., Oluoti, O.J. and Adetuberu, I.A. (2014). Nutritional, Minerals and Phytochemicals composition of *Garcinia cola* [Bitter cola] and *Aframomum melegueta* (Alligator pepper). *IOSR Journal of Environmental Science, Toxicology and Food Technology*. 8(1):86-91.
- Debnath, M., Chejara, V., Vijaya, B.K., Bika, D.S., Kumar, S., Dixit, A., Jain, R. and VJain, V. (2014). Evaluation of quality and impact of untreated waste water for irrigation. *American Journal of Research Communication*, 2(4): 200-231.
- Doherty, V. F., Olaniran, O.O. and Kanife U. C. (2010). Antimicrobial Activities of *Aframomum Melegueta* (Alligator Pepper), *International Journal of Biology*. 2(2):126-131
- Enemor V.H.A., Nnaemeka O.J. and Okonkwo C.J. (2014). Minerals, vitamins and phytochemical profile of *gongronema latifolium*: indices for assessment of its free radical scavenging,

- nutritional, and antinutritional qualities. *International Research Journal of Biological Sciences*, 3(1): 17-21
- Ferman, U., Durrani, F.R., Asad, S., Rifat, U.K. and Shabana, N. (2019). Effects of fenugreek (*Trigonella foenum-graecum*) seed extracts on visceral organs of broiler chicks. *ARPN Journal of Agricultural and Biological Sciences* Pp. 4
- Google Earth. (2022). <http://earth.google.com>
- Jacela, J.Y., Frobose, H.L., DeRouche, J.M., Tokach, M.D., Dritz, S., Good, R.D. (2010). Amino acid digestibility and energy concentration of high-protein corn dried distillers' grains and high-protein sorghum dried distillers' grains with soluble for swine. *Journal of Animal Science* 88: 3617-3623
- Okwu, D.E and Okwu, M.E. (2004). Chemical composition of *Spondias mombia* Linn plant parts. *Journal of Sustainable Agricultural Environment*, 6: 140-147
- SPSS (2022). *Statistical package for the Social Sciences*. Version 28.0 SPSS Inc. Chicago.
- Toshi Wati, A., Tapan, K., Ghosh, A., Basharat Syed, B. and Haldar, S. (2015). Comparative efficacy of a phyto-genic feed additive and an antibiotic growth promoter on production performance, caecal microbial population and humoral immune response of broiler chickens inoculated with enteric pathogens. *Animal Nutrition Journal* Pp: 213–219