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GROWTH RESPONSE OF BROILER BIRDS FED *Asystasia gangetica* LEAF MEAL IN HOT HUMID ENVIRONMENT

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ABSTRACT

A 35- day feeding trial was conducted to study the effects of inclusion of *Asystasia gangetica leaf meal* (AGLM) on the growth response of broiler chickens. Samples of *Asystasia gangetica* leaves were sourced from the Federal University of Agriculture, Abeokuta environment. The leaves were chopped and wilted, sun dried to reduce the moisture level to the minimal level. The dried leaves were milled to produce leaf meal. *Asystasia gangetica leaf meal contain 19.38% crude protein, 15.30% crude fibre, 12.70% ether extract, 1.70% ash and 36.34% NFE.* A total number of 120 day old Marshal Strain of broiler chicks was used. A standard starter diet was fed to the birds prior to the commencement of the experiment. At the end of the 3rd week, birds were allotted into four treatments having three replicates of 10 birds each. Four experimental diets were formulated with varying levels of *A. gangetica* leaf meal (0, 2.5, 5.0 and 7.5 %) respectively. Final live weight and daily weight gain varied significantly ($P<0.05$) among treatment groups. The feed intake and feed conversion ratio were not significantly influenced ($P>0.05$) by dietary treatments. Final weight and weight gain values were found to decrease across the dietary treatments with increasing level of *A. gangetica* leaf meal. The results of the experiment show that the use of *A. gangetica* as feed ingredient in broiler production significantly depressed growth.

Key words: *Asystasia gangetica, leaf meal, growth response, broiler birds.*

INTRODUCTION

Poultry production plays a major role in bridging the protein gap in developing countries where average daily consumption is far below recommended standards (Onyimonyi *et al.,* 2009). Poultry is an important component of Nigerian livestock industry; it contributes significantly to the annual protein supply. However, the productivity of poultry in the tropics has been limited by scarcity and high prices of the conventional protein and energy sources which are limiting factors in poultry feed production in the tropics (Atawodi *et al.,* 2008). Tewe (1999) reported that feed is the most important crucial factor to consider in any livestock enterprise, as it accounts for 60 -80 percent of the total cost of production. Few years ago, more than half of the country's poultry farms have closed down and another thirty percent forced to reduce their production capacity because of shortage of feed (Esonu *et al.,* 2001). There is the need to intensify search for locally available alternative sources of protein for use as feed supplement to poultry. One possible source of

cheap protein to poultry is the leaf meal of some tropical legumes and plants (Iheukwumere *et al.,* 2008). Leaf meals of various plants have been incorporated in the diets of poultry as a means of reducing the high cost of conventional protein sources (D'Mello *et al.,* 1987; Udedibie and Opara, 1998; Kakengi *et al.,* 2007; Nworgu and Fasogbon, 2007; Iheukwumere *et al., 2008*). According to D'Mello *et al.* (1987) and Fasuyi *et al*. (2005) leaf meals do not only serve as protein source but also provide some necessary vitamins, minerals and oxycaretenoids which cause yellow colour of broiler skin, shank and egg yolk.

One of the tropical plants that is of value and has not been thoroughly investigated as feed source in livestock production is *Asystasia gangetica*. The plant belongs to the family of Acanthacae, its common names are creeping fox gloves and Chinese violet. *Asystasia gangetica* is used as forage for cattle and goats in Southeast Asia; it is either grazed or cut for stall feeding (Lee and Chen, 1992). Extracts of *Asystasia gangetica* have shown analgesic and anti-asthmatic properties in pharmacological tests (Sri Endreswari, 2003). The present study was thus designed to investigate the effects of feeding different levels of *Asystasia gangetica leaf* meal (AGLM) on growth response of broiler birds in a hot humid tropical environment. .

MATERIALS AND METHODS

Sourcing and Processing of Asystasia gangetica

The experiment was carried out at the poultry unit of the Teaching and Research Farm, College of Animal Science and Livestock Production, Federal University of Agriculture, Abeokuta. The area is located 76 m above sea level and falls within latitude 7° 15'north and longitude 3°21' east. Mean annual temperature and humidity are 34.7 ^{0}C and 82% respectively. Seasonal distribution of rainfall is approximately 44.96mm in the late dry season (January-March), 212.4mm in the early wet season (April-June), 259.3mm in the late wet season (July-September) and 48.1mm in the early dry season (October-December). Samples of *Asystasia gangetica* were sourced from the university farm of Federal University of Agriculture, Abeokuta, Nigeria. *Asystasia gangetica* leaves were chopped and wilted to facilitate sun-drying to reduce the moisture level to a minimal level. The dried leaves were then milled using a hammer mill with a sieve size of 2.22mm to produce leaf meal.

Experimental birds and management

A total number of 120 day old Marshal Strain of broiler chicks was used. The birds were reared for 3 weeks pre-experimental period before the commencement of the trial. Standard broiler starter ration was fed to the birds during pre-experimental period. All vaccination and medications schedules were strictly adhered to. At the end of the pre-experimental period, the birds were divided into four treatment groups of 30 birds having three replicates of 10 birds each. Birds were fed with experimental diets in a Completely Randomized Design (CRD). Four experimental diets were formulated to include *Asystasia gangetica* meal at 0, 2.5, 5.0 and 7.5% inclusion levels respectively as shown in Table 1. Experimental diets and water were provided *ad libitum* from 3 – 8 weeks.

Chemical Analyses

Proximate analysis of the leaf meal and dietary treatments were conducted using standard methods (AOAC, 1995) to determine their chemical compositions. Gross energy

of leaf meal was carried out using an adia- batic bomb calorimeter model CAL 2k.

Table 1: Gross composition of the experimental diets

	Dietary level of *Asystasia gangetica* leaf meal %			
Ingredients	**0**	**2.5**	**5.0**	**7.5**
Maize grain	52.0	52.0	52.0	52.0
Soyabean meal	18.0	18.0	18.0	18.0
Groundnut cake	5.0	5.0	5.0	5.0
Asystasia gangetica leaf meal	0	2.5	5.0	7.5
Fish meal	2.0	2.0	2.0	2.0
Wheat offal	19.3	16.8	14.3	11.8
Bone meal	2.0	2.0	2.0	2.0
Limestone	1.0	1.0	1.0	1.0
Salt	0.25	0.25	0.25	0.25
*Premix	0.25	0.25	0.25	0.25
Lysine	0.1	0.1	0.1	0.1
Methionine	0.1	0.1	0.1	0.1
Total	100	100	100	100
Determined chemical composition (%)				
Crude protein	18.15	18.38	18.49	18.55
Ether Extract	4.68	5.27	5.31	5.87
Crude Fibre	4.03	4.23	4.45	4.67
Ash	11.86	11.97	12.13	12.31
NFE	49.57	50.59	50.64	50.9

*Premix (Supamix) to supply kg/diet, Vit A 1000000iu, Vit $D_3$1200000iu, Tocopherol 8000iu, Vit K 1000mg, Folacin 400mg, Copper 2500mg Iodine 400mg, Cobalt 80mg, Calcium Pantothenate 3500 Pyridoxine 1500mg, Cyanocobalamine 7.5mg, Biotin 3mg, Thiamine 900mg, Riboflavin 1800mg, Niacin 12500mg, Mg 40000mg/ Zn 25000mg, Fe 15000mg, Choline Chloride 200000mg, Se 35mg, BHT 25000mg, Anticaking agent 600mg.

Data collection

Performance indices measured were final live weight, weight gain, feed intake and feed conversion ratio.

Statistical Analysis

All data collected were subjected to one way analysis of variance using model for completely randomized design (CRD) SAS (2001) and significant differences were separated using Duncan's multiple range test (Duncan, 1955).

RESULTS

The chemical composition of experimental diets and of AGLM are presented in Tables 1 and 2 respectively. AGLM had a crude protein and energy values of 19.38 and 2800 kcal/kg. The diets were very close in their crude proteins (18.15-18.55%). The growth response of broiler birds fed experimental diets is shown in Table 3. Average final weight and daily weight gain of birds reduced significantly ($P<0.05$) with increasing dietary inclusion levels of AGLM. Feed intake and feed: gain were found not to be affected ($P>0.05$) by dietary inclusion of the AGLM. Meanwhile, birds fed control diet had the lowest FCR value (2.97).

Table 2: Proximate composition of *Asystasia gangetica* leaf meal

Nutrients	Value (%)
Moisture	14.54
DM	85.45
Crude protein	19.38
Crude fibre	15.30
Ether extracts	12.70
Ash	1.74
NFE	36.34
Metabolisable energy (kcal/kg)	2800.57

Table 3: Effect of dietary levels of *Asystasia gangetica* leaf meal on growth response

	Level of Inclusion of AGLM %				SEM
Parameters	0	2.5	5.0	7.5	
Initial bird weight (g/bird)	390.00	393.33	380.00	390.00	3.72
Final bird weight (g/bird)	1950.00a	1903.00b	1896.67b	1890.00b	18.16
Daily weight gain (g/bird)	44.59a	43.52b	43.05bc	42.76c	0.17
Feed intake (g/bird)	133.70	133.51	133.42	133.40	0.02
Feed conversion ratio	2.97	3.06	3.10	3.13	0.02

[abc] Means within same row with different superscripts are significantly different ($P<0.05$)

DISCUSSION

The highest final weight and average weight gain by birds fed the control diet suggests that this diet promoted better growth than the AGLM based diets. This finding agrees with the work of Esonu *et al.* (2003) who assessed the potentials of *Microdesmis puberrula* leaf meal as feed ingredient and showed that increased dietary inclusion levels resulted in decreased weight gain. It also agrees with the work of Dada *et al.* (2000) who supplemented broiler finisher with *leucaena leucocephala* leaf meal and obtained reduced final weight and daily weight gain. The poor growth ascribed to birds fed AGLM based diets might be partly due to adverse effect of amino acid imbalance in the leaf meal based diets compare with the control. Aletor *et al.* (2000) reported that diets with balance amino acid produce attendant improvement in broiler performance. The reduced live weight, weight gain and higher FCR due to feeding AGLM based diets compared to feeding control may also in part be attributed to the increased level of dietary fibre which could impair dietary utilization (Nwokolo *et al., 1985*). Similarly, the leaf meal might contain residual anti-nutrient factors and the concentration may be at higher levels of dietary inclusion of the meal, hence, the higher depressing effect on broiler performance. Meanwhile, it has generally been observed that high inclusion of leaf meal in poultry diets causes depression in the growth performances (D'Mello and Acamovic, 1989). The non significant effect of feed intake across the dietary treatments obtained in this study is confirmatory to the fact that dietary inclusion of *A. gangetica* showed no effect on voluntary intake of the birds. This is at variant with earlier work of Esonu *et al.* (2003) who opined that the inclusion of a fibrous material in a feeding trial had an energy dilution effect on feed and consequently increased intake. Also several other reasons have been adduced (Nir *et al.,* 1994 and Odunsi *et al.,* 1996) that variation in the feed intake could be as a result of the alteration in the texture, taste, colour and odour of diets. The feed conversion result in this study agrees with the result obtained by Dada *et al.* (2000) who reported non- significant difference in feed to gain ratio in birds fed three dietary levels 5, 10 and 15 % respectively of *leucaena leucocephala* leaf meal. In addition, values of feed conversion ratio obtained in this study with birds fed *Asystasia gangetica* were poorer compared with what was obtained by Odunsi *et al.* (1996) when broiler chicks were fed wild sunflower leaf meal.

CONCLUSION

The use of *Asystasia gangetica* leaf meal in the diet of broiler birds in this study resulted in reduced growth response.

REFERENCES

Aletor, V.A., Hamid I.I. , Niess, E., Pfeffer, E. 2000. Low protein amino acid supplemented diets in broiler chickens: Effect on performance, carcass characteristics, whole body composition and efficiencies of nutrient utilisation. *J. Sci. Food Agric., 80*: 547-554.

Association of Official Analytical Chemists (A.O.A.C), 1995. Official Methods of Analysis. 16th ed. Washington, D.C, USA.

Atawodi, S. E., Mari, D., Atawodi, J. C., Yahaya, Y. 2008. Assessment of *Leucaena leucocephala* leaves as feed supplement in laying hens. *African Journal of Biotechnology.*7 (3): 317-321.

D. Mello J. P. F., Acamovic T., Walker A.

G. 1987. Evaluation of Leucaena leaf meal for broiler growth and pigmentation. *Tropical Agriculture (Trinidad),* 64:34 – 35.

D'Mello, J.P.F., Acamovic, T. 1989. *Leucaena leucocephala* in poultry nutrition: A Review. *Animal Feed Science and Technology.* 26: 1 - 28.

Dada, S. A. O., Atanda, L. A., Alabi, B. E. 2000. Utilization of *Leucaena* leaf meal as a protein supplement in broiler finisher rations. *Nig. J. Anim. Prod.,* 27: 40 – 44.

Duncan, D. B. 1955. Multiple range and multiple F-test. *Biometrics*. 11: 1 – 42.

Esonu, B.O., Emanalom, O.O., Udedibie, A.B.I., Herbert, U., Ekpor, C.F., . Okoli, I.C., Iheukwumere. F.C. 2001. Performance and blood chemistry of weaner pigs fed raw mucuna (velvet bean) meal. *Tropical Anim. Prod. Invest.,* 4: 49-54.

Esonu, B.O., Ihenkwumere, F.C., Iwuji, T.C., Akamu, N., Nwugo, O.H. 2003. Evaluation of microdesmis puberula leaf meal as feed ingredient in broiler starter diets. *Nig. J. Anim.* Prod. 30 (1): 3-8.

Fasuyi, A.O., Dairo, F.A.S., Adeniji, A.O. 2005**.** Tropical Vegetable (*Amaranthus Cruentus*) leaf meal as alternative protein supplement in broiler starter diets: Bionutritional evaluation. *Journal of Central European Agriculture*. 9 (1): 23-34.

Iheukwumere, F.C., Ndubuisi, E.C., Mazi, E.A., Onyekwere M.U. 2008. Performance, Nutrient Utilization and Organ Characterstics of Broilers Fed Cassava Leaf Meal (*Manihot esculenta* Crantz). *Pakistan Journal of Nutrition.* 7(1): 13- 16.

Kakengi, A.M.V., Kaijage, J.T., Sarwatt, S.V., Mutayoba, S.K., Shem, M.N., Fujihara T. 2007. The effect of *Moringa oleifera* leaf meal as a substitute for sunflower seed meal on performance of laying hens in Tanzania. *Livestock Research for Rural Development.* 19, (8). http://www.lrrd.org/lrrd19/8/kake19120.htm.

Lee, S. A., Chen, C. P. 1992.. *Asystasia gangetica* (L.) In: 't Mannetje, L. and Jones, R. M. (Editors). Plant Resources of South – East Asia No. 4 Forage. Pudoc scientific Publishers, Wageningen, Netherlands. Pp.51 – 53.

Nir, I., Twina, Y., Grossman, E., Nitsan, Z. 1994. Quantitative effects of pelleting on performance, gastro-intestinal tract and behavior of meat type chicken. *British Poultry Science* 35: 589 – 602. NY Springer – Vallock, New York.

Nwokolo, E.N., Akpapunam. M., Ogunjimi, T. 1985. Effect of varying level of dietary fibre on mineral availability in poultry diets. *Nig. J. Anim. Prod., 12:* 129-133.

Nworgu, F.C., Fasogbon, F.O. 2007. Centrosema *(Centrosema pubescens)* leaf meal as protein supplement for pullet chicks and Growing pullets. *International Journal of Poultry Science.* 6(4): 255-260.

Odunsi, A. A., Farinu, G. A., Akinola J. O. 1996. Influence of dietary wild sunflower (*Tithonia diversifolia* Hemls A. Gray) leaf meal on layers performance and egg quality. *Nig. J. Anim. Prod., 23: 28-32.*

Onyimonyi, A.E., Olabode, A.,Okeke, G.C. 2009. Performance and economic characteristics of broilers fed varying dietary levels of Neem leaf meal (*Azadirachta indica*). *International Journal of Poultry Science.* 8 (3): 256-259.

Sri Endresari. 2003. Asystasia Blume. In: Lemmens, F.H.M.J. & Bunyapraphatasar, N. Plant Resources of South-East Asia No. 12 (3). Medicinal and poisonous plants 3. Backhuys Publishers, Leiden, Netherlands. Pp. 86 – 88

Statistical Analysis System (SAS). 2001. SAS User's Guide. SAS, Institute Inc., Cary North California, USA.

Tewe, O.O. 1999. Sustainability and Development: Paradigms from Nigeria Livestock Industry. Inaugural Lecture delivered on behalf of Faculty of Agriculture and Forestry, University of Ibadan, Ibadan, Nigeria. October 1997. Pp. 37.

Udedibie, A.B.I., Opara, C.C. 1998. Responses of growing broilers and laying hens to the dietary inclusion of leaf meal from *Alchornea cordifolia*. *Animal Feed Science and Technology*. 71: 157-164.

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