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VARIOUS GROWTH PERFORMANCE AND CARCASS TRAITS OF BROILER CHICKENS FED WITH GRADED LEVEL OF *ASPILIA AFRICANA* FOR 8 WEEKS

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Abstract: Considerable controversy still remains on the use of antimicrobials to promote growth in food animal production. Therefore, alternative strategies have been actively researched to replace these antimicrobials. This study evaluated the growth performance and carcass traits of broilers fed different level of inclusion of dried and grinded *Aspilia africana* leaf in a completely randomized design. The powdered *Aspillia africana* was mixed with the broilers feed throughout the period of the experiment. A total number of 120 day old- broiler chicks were used and divided into 4 different groups (A, B, C and Control) with (50g, 60g, 70g and 0g respectively) of/kg of feed and lasted for 8 weeks. The feed intake of the birds in various groups were also measured daily throughout the period of the experiment, the carcass value of the birds were evaluated at the 8th week of the experiment. Data were obtained on body weight, feed intake, weight gain and carcass values of the birds were compared and contrasted between the groups. However, the growth performance, carcass characteristics (primal cuts and organ weights) of the birds were significantly different ($P<0.005$) in the three treatment groups. The effect of *A. Africana* on the birds fed with the highest proportion showed the highest significant difference. It was concluded that *A. Africana* as a growth promoter could be a useful, cheap and readily available agent in poultry farming.
Keywords: *Aspilia Africana*, broiler chickens, growth performance, carcass traits.

INTRODUCTION

Poultry meat and eggs offer considerable potentials for bridging the protein gap, because high yielding exotic poultry adapt easily to the tropical environment and the technology of production is relatively simple with returns on investment appreciably high (Ekenyem and Madubuike, 2006). The incessant rise in feed cost and the resultant shortage in animal protein supply have encouraged the exploitation of locally, available and cheap

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animal and feed resources to forestall threat to the future of poultry production (Runjaic-Antic *et al*., 2010; Obuzor and Ntui, 2011).

The suitability of a number of plant species in the sustainable production animal feed is being exploited CTA, 2006. Medicinal ingredients of plant origin have different chemical nature and show a very wide range of pharmacological effects such as antibacterial activity, anti-inflammatory, astringent, antidiarrhoeal, digestion-stimulating, laxative, sedative, spasmolytic and choleretic (Runjaic-Antic *et al*., 2010; Hashemi *et al*., 2008).

Plants also have high amount of vitamins, minerals and contain pigments such as oxy-carotenoids, xanthophyllys useful for skin and egg pigmentations in birds (D'Mello and Acamovic, 1989). Plant materials such as herbs, spices, plant extracts, essential oils and meals are also receiving increased attention as possible natural alternatives to antibiotic growth promoter to boost monogastric performance (Al-Kirshi *et al*., 2010; Hashemi *et al*., 2008; Hernandez *et al*., 2004).

Several in-vitro studies have been conducted on marigold (*Aspilia africana)* leaf as antimicrobial agents (Kuaite *et al*., 1999; Okoli *et al*., 2007). However, limited publish reports are available on the effect of bush marigold leaf meal or extracts as growth promoter in monogastric production. Therefore, this research wants to examine the similar roles and functions of *Aspilia africana* in broiler chickens diet as a growth promoter against the use of synthetic antibiotics which is currently phasing out globally in animals destined for meat production. The usefulness of this leaf has brought about this study directed at showcasing various growth performance and quality traits of broiler chickens fed with graded level of *Aspillia africana* for 8 weeks.

MATERIALS AND METHODS

Site of the experiment

The experiment was carried out at the Poultry unit of Teaching and Research Farm Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria. Ogbomoso is a derived Savanna Zone of Nigeria that lie within the latitude 8^1 15^0 North and longitude $4^1 15^0$ East. The area has a annual rainfall of 1247mm with altitude between 300-600 meter above the sea level while the mean annual temperature is about 27^0C (Amao *et al*., 2011).

Animal housing and Management

Few days before the arrival of the chicks, the brooder house was been toughly cleansed and disinfected with morigad. The brooder house was partitioned into five different pens and each pen was demarcated to get different cells, this was done to avoid mix up and in a way that

allow ventilation. The already gotten wood shavings were spread on the ground for brooding and were constantly changed every week to prevent diseases. Feeding trough and drinkers were provided in the brooder house, the pen was pre heated and the temperature was been monitored (27^0C). 120 day - old chicks of Abor ache broiler strain was purchased from Ajanla farm, Lagos-Ibadan express way, they were randomly divided into 4 treatment groups A, B, C and control having 30 birds each with 3 replicate per group and 10 birds per replicate.

Leaf meal preparation

The fresh leaves of *Aspilia africana* were collected at the CTC section of Lautech Teaching and Research farm, Ogbomoso. After collecting enough quantity of *Aspilia africana* leaf, leaves were air dried to a constant weight for several days and then grounded into a powered form.

Experimental diets

The control diet had 0g of *Aspilia africana*, the chicks in treatment. A was placed on 50g of dried grounded *Aspilia africana*/1kg of feed, treatment B on 60g of dried grounded *Aspilia africana*/1kg of feed while treatment C was placed on 70g of dried *Aspilia africana*/1kg of feed. The compositions of the diets are shown in tables (1 and 2). Proximate composition of the experiment diets were analysed according to AOAC (1990) method as shown in table 3. All animals were housed under identical conditions of temperature and humidity. Clean water was readily available to the birds *ad-libitum,* vaccination and medication was done as at when necessary.

Data collection

Data were collected on various growth performance of the birds, such as feed intake (g) on a daily basis, weight gain (g) and feed to gain ratio and carcass evaluation was obtained at the end of 8^{th} week from randomly selected 27 birds from each treatment, totaling 108 broiler chickens, on primal cuts (breast, thigh, drumstick, back, wing, neck, shank and head) and visceral organs (Liver, kidney, lungs, heart, empty gizzard, whole gizzard and GIT).

Statistical Analysis

All data collected were subjected to one way analysis of variance (ANOVA) using SAS (2000), Duncan's multiple range tests were used to separate the means.

RESULTS AND DISCUSSION

Table 4 showed the result of growth performance of broiler chickens at 8^{th} weeks of age. The birds on control showed the highest significant difference ($P<0.05$) in the total feed consumed

and it was followed by treatment C while birds on diet B had the lowest feed intake. Similar trend was also followed in the weight gain as the birds on control diet gained the highest ($P<0.05$) significant weight while the least was found in diet B. Feed to weight gained ratio also favoured the birds on control diet while 0.26, 0.24 and 0.27 were recorded for birds on diet A, B and C respectively. Growth performance characteristics of broiler chickens fed with *Aspilia africana* inclusion in the feed given when compared to the control groups, had influence on the feed intake and weight gained. Diet C with an inclusion of 70g *Aspilia africana* showed the highest feed intake compared to the control and the weekly body weight gain was also observed in treatment C which had the highest weight gain. The best performance was observed at 70g inclusion of *Aspilia africana.* The feed intake was observed to be lower in treatment groups than control because the photochemical analysis of the plant reveals that it is high in crude oil, protein, sterols and it is also rich in saponins, tannins (Adeniyi and Odufowora, 2000). This anti-nutrients has led to the acceptability of the feed containing grinded *Aspilia africana* to be relatively lower to control because tannins bind feed protein to the salivary gland and epithelium of the mouth, making feed unpalatable, where feed intake of the birds is minimal. This present study was also similar to the findings earlier reports of D'Mellow and Devandra, (1995) that the present of some toxic factors inherent in leaf products have been implicated for the depression in feed intake as observed in broiler chicken fed with *Aspilia Africana* leaf but contradicted to the findings of Alcicek *et al*., (2003); that plant products had no significant effects on the body weight of birds.

There were significant ($P < 0.05$) differences between the treatment diets and carcass traits of the broiler chickens as shown in table 5. The control diet was significantly highest values for both live weight and the dressing percentage and followed closely was treatment A. The trend of values in this present study for live weight and dressing percentage were compactable with earlier findings of Gordon and Charles, (2002). Table 6 represent the primal cuts of broiler chickens fed *Aspillia Africana* for 8 weeks. The result reveals that control diet was significantly ($P <0.05$) highest for breast weight (16.15g), thigh (10.27g), drumstick (9.41g), wing (8.46) and shank weight (5.00g) and followed closely was treatment A while back (15.10g) and head (3.94g) were highest for treatment C and B respectively. The present findings supported the notion that plant extracts improved the carcass yield of birds as reported by Alicicek *et al.,* (2004) but contradicted the findings of Sarica *et al*., (2005) and Cabuk *et al*., (2006) that oregano leaf extracts had no significant effect on the carcass characteristics of birds. Organ weight of broiler chickens fed *Aspillia Africana* for 8 weeks is

shown in table 7. There were significant ($P < 0.05$) difference between the organ weight of the birds and the treatment diets. Kidney, whole gizzard, gastro intestinal tract and heart had a better performance on treatment C while control diet had the lowest values. Liver of the bird had the highest value for treatment A with the least values obtained for control diet. The organ weight showed a visible difference on the organ weight of broiler fed *Aspilia africana* inclusion when being compared with control diet which had lower value in all the parameters except lungs and empty gizzard. This is because the haemostatic, antibacterial, membrane stabilization and anti-inflammatory activities of *Aspilia africana* have been reported and calculated that the potential of the possess constituents of inhibiting the growth of microbial wound contaminant. This has earlier documented by Adedeji *et al*., (2014b) for broilers raised on *Aspilia Africana* meal for 12 weeks and Fanatico *et al.*, (2007), thus reported that visceral organs of chicken genotypes fed low- nutrient and outdoor access had significant higher organs weight than birds raised indoors with conventional feeds.

CONCLUSION AND RECOMMENDATION

Based on the result drawn from this experiment, it was visible that carcass evaluation of the birds increased significantly in some economical and other parts of the bird fed with 50g inclusion of *Aspilia africana* at the end of 8 weeks. Such parts include thigh, drumstick and the neck and shank. The feeding habit and weight gained were also influenced by the inclusion of *Aspilia africana* at the inclusion level of (70g) diet C, the feed intake and weight gain was low compared to that of control. Finally the mortality rate during this experiment was higher in treatment C (70g inclusion of *Aspilia africana)* and lower in treatment A (50g inclusion of *Aspilia africana*).

Following the results of this experiment, it had been demonstrated that *Aspilia africana* at an inclusion level of 70% which is the highest inclusion level could be used as growth promoting additive in broiler feed at age above the maturity of broiler birds.

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Table 1: Gross composition of feed used in feeding the birds (starter phase)

Ingredients	Control	Group A	Group B	Group C
Maize	55.00	55.00	55.00	55.00
GNC	15.00	15.00	15.00	15.00
Soybean	10.00	10.00	10.00	10.00
Fishmeal	2.00	2.00	2.00	2.00
Wheat offal	8.30	8.30	8.30	8.30
Oyster shell	1.00	1.00	1.00	1.00
Bone meal	2.00	2.00	2.00	2.00
PKC	5.00	5.00	5.00	5.00
Salt	0.25	0.25	0.25	0.25
Blood Meal	3.00	3.00	3.00	3.00
Methionine	0.10	0.10	0.10	0.10

Lysine	0.10	0.10	0.10	0.10
Premix	0.25	0.25	0.25	0.25
Total (kg)	100	100	100	100
A.africana(g)	Nil	50.00	60.00	70.00
Crude protein(%)	22.65	22.65	22.65	22.65
ME(Kcal/kg)	2960	2960	2960	2960

Table 2: Gross composition of feed used in feeding the birds (finisher phase)

Ingredients	**Control**	**Group A**	**Group B**	**Group C**
Maize	50.00	50.00	50.00	50.00
Soy meal	6.00	6.00	6.00	6.00
GNC	13.00	13.00	13.00	13.00
PKC	8.50	8.50	8.50	8.50
Fishmeal	3.00	3.00	3.00	3.00
Wheat offal	13.30	13.30	13.30	13.30
Oyster shell	1.50	1.50	1.50	1.50
Bone meal	2.00	2.00	2.00	2.00
Blood meal	3.00	3.00	3.00	3.00
Salt	0.25	0.25	0.25	0.25
Methionine	0.10	0.10	0.10	0.10
Lysine	0.10	0.10	0.10	0.10
Premix	0.25	0.25	0.25	0.25
Total (kg)	100	100	100	100
A.africana	Nil	50.00	60.00	70.00
Crude protein(%)	21.06	21.06	21.06	21.06
ME(Kcal/kg)	2797	2797	2797	2797

Table 3: Proximate composition of experimental diets

Parameters (%)	Control	Group A	Group B	Group C
Crude protein	10.50	8.75 `	7.26	7.08
Crude fibre	9.80	6.02	4.11	8.23
Ether extracts	22.08	21.45	20.65	20.71
Ash	9.45	11.35	9.58	8.05

Table 4: Growth performance of broiler chickens fed *Aspillia africana* for 8 weeks

Parameters	Control	A (50g)	B(60g)	C(70g)	SEM
Feed intake (g)	3575.25^{a}	3354.50^{c}	3213.00^{d}	3483.50^{b}	1.10
Weight gain (g)	1105.00^{a}	855.00^{c}	837.00^{d}	875.50^{b}	20.41
Feed to weight gain	0.31^{a}	0.26^{b}	0.24^{c}	0.27^{b}	0.01

^{abc}Means in the same row followed different superscripts are significantly different (P<0.05).
SEM = standard error of means

Table 5: Carcass characteristics of broiler chickens fed *Aspillia africana* for 8 weeks

Parameters	Control	A (50g)	B (60g	C(70g)	SEM
Live weight (g)	1150.00^{a}	900.00^{b}	875.000^{b}	875.00^{b}	22.34
Defeathered Weight	89.54^{a}	82.60^{b}	86.52^{a}	88.96^{a}	1.77
Dress Weight (g)	60.14^{a}	54.37^{a}	50.09^{a}	55.16^{a}	1.71

^{abc}Means in the same row followed different superscripts are significantly different (P<0.05).
SEM = standard error of means

Table 6: Primal cuts of broiler chickens fed with *Aspillia africana* for 8 weeks

Parameters	Control	A (50g)	B (60g)	C(70g)	SEM
Breast weight	16.15^{a}	14.47^{b}	12.71^{b}	15.14^{b}	0.51
Thigh	10.27^{a}	11.03^{a}	8.92^{c}	9.33^{b}	0.37
Drumstick	9.41^{a}	9.28^{a}	8.92^{c}	9.33^{b}	0.26
Back	12.31^{b}	12.87^{ab}	13.19^{ab}	15.10^{a}	0.46
Wing	8.46^{a}	8.43^{b}	7.96^{bc}	7.62^{c}	0.21
Neck	3.74^{b}	4.30^{a}	3.55^{c}	3.61^{bc}	0.19
Shank	5.00^{a}	5.19^{a}	4.51^{b}	5.02^{a}	0.12
Head	3.20^{c}	3.61^{b}	3.74^{a}	3.07^{c}	0.8

^{abc}:Means in the same row followed different superscripts are significantly different (P<0.05).
SEM = standard error of means

Table 7: Organ weight of broiler chickens fed *Aspillia africana* for 8 weeks

Parameters	Control	A (50g)	B (60g)	C (70g)	SEM
Liver	2.19[b]	2.41[a]	2.34[a]	2.36[a]	0.07
Kidney	0.54[a]	0.69[a]	0.62[a]	0.70[a]	0.32
Lungs	0.71[a]	0.68[a]	0.64[a]	0.66[a]	0.34
WG	4.59[c]	4.84[bc]	5.04[b]	5.43[a]	0.14
EG	3.07[a]	3.20[a]	3.03[a]	2.91[a]	0.93
GIT	7.42[a]	9.86[a]	9.58[a]	10.32[a]	0.26
Heart	0.45[a]	0.48[a]	9.58[a]	10.32[a]	0.02

[abc]:Means in the same row followed different superscripts are significantly different (P<0.05). SEM = standard error of means, GIT = Gastro intestinal tract, WG= Whole gizzard, EG= Empty gizzard