

BLOOD CHEMISTRY AND CARCASS CHARACTERISTICS OF BROILER FINISHERS FED *PHYLLANTHUS AMARUS* LEAF EXTRACT

¹Onwujiariri, E.B., ²Kadurumba O.E., ¹Anunwany, O.C.

¹Department of Animal Production Technology Federal College of Agriculture Ishiagu Ebonyi State.

²Department of Animal Science and Technology, Federal University of Technology Owerri Imo State.

Corresponding author email: kadurumbaoc@gmail.com

ABSTRACT

A 4 weeks feeding trial was carried out to investigate the effect of *Phyllanthus amarus* leaf extract on blood parameters and carcass characteristics of broiler finisher birds. *Phyllanthus amarus* leaf extract was administered in drinking water at 0.0%, 1.0%, 1.5% and 2.0% inclusion level to one hundred and twenty 4 weeks old broiler birds randomly allocated to four treatments (T_1 , T_2 , T_3 , T_4) and replicated three times with 10 birds per replicate in a completely randomized design. The birds were fed with commercial feed ad libitum. Prior to administering the test material *Phyllanthus amarus* extract from the leaves was subject to proximate analysis to determine its composition. At the end of the experiment, two birds per replicate were randomly selected, starved for 12 hours and slaughtered for carcass characteristics. Parameters, measured include breast muscle, drumstick, neck, head, shank and thigh muscle. Blood samples were collected from 24 birds, 2 from each replicate for blood chemistry analysis and parameters measured include total protein, creatinine, glucose, urea, albumin and globulin. The proximate analysis of *Phyllanthus amarus* leaves extract show that the leaf contains high levels of carbohydrate (45.50%) and Crude Fibre (24.50%), 11.05% Moisture, 6.10% protein, 6.03% fat and 6.80% Ash. Results showed that birds administered with *Phyllanthus amarus* extract showed significant ($p > 0.05$) difference for all carcass parameters measured. Birds administered with *Phyllanthus amarus* extract at 1.5% inclusion level had significantly higher values for mean live weight (2683.3g), dressed carcass (2520g), head (102.3g), breast muscle (627.6g), neck (202.3g), drumstick (176.3g), thigh (154.3g) and shank (76g). All blood parameters measured did not show any significant differences ($p > 0.05$) although broilers administered with *Phyllanthus amarus* extract at 1.5% inclusion level showed higher values for albumin (2.92g/dl), globulin (0.71g/dl), creatinine (1.67mg/dl), glucose (381.2mg/dl) and total protein (g/dl). The study showed that *Phyllanthus amarus* leaf extract can be used to boost carcass and blood chemistry performance of broiler finisher birds at 1.5% inclusion level.

Keywords: broilers, leaf extract, blood, carcass

INTRODUCTION

In non-ruminant animal feeding, demand for cereals and legumes by man, animals and industries have given rise to rise in the cost of livestock feeds. To surmount this, there is need to exploit other alternatives especially the non-competitive feed resources. Identification, processing and use of many lesser known tropical plants in poultry diets will help in reducing the over dependence on conventional feedstuffs (Ahiwe *et al.*, 2015). *Phyllanthus amarus* is a broad spectrum medicinal plant which is employed to reduce pain, expel intestinal gas, stimulate and promote digestion and as anti-helminthes to expel intestinal worms. It is called "Oyomokeisoamankedem" in Efik, "Iyin Olobe" in Yoruba and "Ebebenizo" in Benin (Etta, 2008). The phytochemical analysis of *Phyllanthus amarus* extract confirmed the presence of tannins, saponins, flavonoids and alkaloids (Krithika and Verma, 2009). However, previous studies have indicated that some chromatographic fractions obtained from *Phyllanthus*

amarus may have potentially deleterious effects on blood biochemistry (Adeneye *et al.*, 2006). *Phyllanthus amarus*, like other tropical tree leaves contains some bioactive compounds which may affect nutrient utilization, haematological and serum biochemical parameters in animals (Ogbuewu *et al.*, 2010; Akpan *et al.*, 2008). The ingestion of numerous dietary materials have been reported to have measurable effects on blood constituents of animals (Ogbuewu, 2011). Esonu *et al.* (2006) reported that haematochemical constituents of blood is vital for nutritional evaluation of an animal.

Phyllanthus amarus is grown in abundance in Nigerian soils and contain some nutrients that can serve as a supplement to the unavailable feed ingredients in a cheaper and available rate which can enhance the growth of birds. Hence this study was undertaken to determine the effect of including *Phyllanthus amarus* extract on blood chemistry composition and carcass characteristics of broiler finisher birds.

MATERIALS AND METHODS

The study was conducted at the poultry unit of Federal college of Agriculture Ishiagu (FCAI) Ebonyi State. Ishiagu is located on Latitude 5°56'N and longitude 7°31'E having an annual rainfall of 1655mm with an average temperature of 25°C, average humidity of 88% and altitude of 50m. The sample of whole *Phyllanthus amarus* leaves were collected in and around FCAI. The sample was dried, ground and soaked in a solution of ethanol for 48hours, it was then allowed to cool and then filtered. The filter was subjected to evaporation. The stock solution of the extract obtained was used in preparing different concentration of the test solution. A total of one hundred and twenty (120) day old unsexed sayed broiler was used for the study that lasted for 4 weeks. The bird were randomly assigned to four 4 experimental treatment in a complete randomized design (CRD). Each treatment was replicate three times with ten 10 bird per replicate. *Phyllanthus amarus* extract was added in the drinking water in the following proportion 0%, 1.0%, 1.5%, 2.0% for the experimental treatments (T1, T2, T3 and T4) respectively. The birds were fed with commercial feed *ad libitum* throughout the study period. Before the bird arrived, the pen used for brooding was washed, disinfected, allowed to dry and covered with wood shaving as litter material. Routine vaccination, medication and proper sanitation were maintained to prevent disease outbreak. At the end of the experiment, 2 birds were selected at random from each replicate making a total of 6 birds from each treatment for blood chemistry analysis. 2ml of blood was collected using sterile

syringe and needle through the wing web of the birds. The blood samples were stored in EDTA bottles and analysed at the Alpha medical Research Laboratories Umuahia Abia State. The following parameters; total protein, creatinine, urea, glucose, albumin and globulin was determined as described by Lamb (1991). For carcass characteristics, two birds per replicate were randomly selected, starved for 12hours and slaughtered. Parameters, measured included live weight, dressed carcass, breast muscle, drumstick, neck, head, shank and thigh muscle. The live weight and dressed carcass weight was collected before and after slaughter. The data collected was subjected to analysis of variance (ANOVA) and differences in means was separated using Fishers least significant difference (LSD) as outline by Steel and Torries (1980).

RESULTS AND DISCUSSION

The proximate analysis of *Phyllanthus amarus* leaves extract is shown in Table1. The results show that the leaf contains high levels of carbohydrate (45.50%) and Crude Fibre (24.50%) indicating that the leaf maybe useful for gastrointestinal development and improved performance when used in broiler rations. Results also showed that *Phyllanthus amarus* contains 11.05% Moisture, 6.10% protein, 6.03% fat and 6.80% Ash content. The values obtained in this study compares favourably with 10.10% moisture, 6.50% Ash, 7.15% Fat 8.45% Protein, 21.50% Fibre and 43.30% Carbohydrate reported by Okwute *et al.* (2015) and suggests the plant can be used as a vegetable plant while Sedoc (1992) suggests its usefulness as tonic.

Table 1: Proximate composition of *Phyllanthus amarus*

Compound	Composition%
Moisture	11.05 ±0.08
Ash	6.80 ±0.03
Fat	6.03± 0.04
Crude Protein	6.10 ±0.02
Carbohydrate	45.50± 2.15
Crude Fiber	24.50 ±21.15

The results of carcass characteristics of broiler finisher chickens administered with *Phyllanthus amarus* extract are presented in Table 2. All parameters measured were significantly influenced ($p>.05$). Birds administered with *Phyllanthus amarus* extract at 1.5% inclusion level had significantly higher values for mean live weight (2683.3g), dressed carcass (2520g), head (102.3g), breast muscle (627.6g), neck (202.3g), drumstick (176.3g), thigh (154.3g)and shank (76g). At 1% inclusion level, birds administered with *Phyllanthus amarus* extract had significantly higher values for mean live weight (2566.7g), dressed carcass (2383.3g), breast muscle (623.6), neck (201g) and drum stick (174.6g).

Again at 2.0% inclusion level, head (98.3g), thigh (153.3g) and shank (75g) of birds administered with *Phyllanthus amarus* extract had significantly higher values compared to 0% and 1.0% inclusion levels respectively. The result of this study agrees with Jagadeeswaran and Selvasubramanian (2014) that reported administration of *Phyllanthus nururi* at 1% inclusion level had positive effect on growth performance of broiler birds and Joshi *et al.* (1987) that reported *Phyllanthus amarus* as a growth promoter. The findings of this work equally suggest that *Phyllanthus amarus* extract contains enzymes that stimulate feed intake which positively affects carcass weight in birds (Devagowda *et al.*, 1989).

Table 2 Effect of *Phyllanthus amarus* extract on carcass characteristics of broiler finisher birds

Parameter	Inclusion levels				SEM
	0%	1.0%	1.5%	2.0%	
Mean live weight (g)	2540.0 ^c	2566.7 ^b	2683.3 ^a	2333.3 ^d	76.41
Dressed carcass (g)	2360 ^c	2383.3 ^b	2520 ^a	2116.6 ^d	708.44
Head (g)	80.0 ^d	96.0 ^c	102.3 ^a	98.3 ^b	8.70
Breast muscle (g)	621.6 ^d	623.6 ^b	627.6 ^a	622.6 ^c	9.73
Neck (g)	155.0	201.0 ^b	202.3 ^a	198.3 ^c	6.03
Drumstick (g)	151.3 ^c	174.6 ^b	176.3 ^a	126.3 ^d	47.90
Thigh (g)	147.6 ^d	148.3 ^c	154.3 ^a	153.3 ^b	45.40
Shank (g)	73.6 ^d	74.6 ^c	76.0 ^a	75.0 ^b	3.22

abcd: means within the row with different superscripts are significant (p<0.05) different.

The results on blood chemistry analysis of broiler finisher birds administered with *Phyllanthus amarus* extract are presented in Table 3. All blood parameters measured did not show any significant differences (p>0.05) although broilers administered with *Phyllanthus amarus* extract at 1.5% inclusion level showed higher values for albumin (2.92g/dl), globulin (0.71g/dl), creatinine (1.67mg/dl), glucose (381.2mg/dl) and total protein (g/dl). Urea levels ranged from 3.50 – 3.16mg/dl highest (3.50mg/dl) and lowest (3.16mg/dl) values at 1.0% and 2.0% inclusion levels respectively. The result of this study shows that all the blood chemistry parameters measured are within normal reference range for healthy chickens (Mitruka and Rwansly, 1977) and this suggest that *Phyllanthus amarus* extract were

well tolerated by the birds. These values are equally comparable to the values reported by Ologhobo and Adejumo, (2015) for total protein, albumin, urea and creatinine when *Phyllanthus amarus* extract is fed to chicken broilers. In a related study, aqueous extract of *Phyllanthus amarus* significantly affected Pack Cell Volume and Haemoglobin concentrations of albino rats (James *et al.*, 2009). The high level of albumin, creatinine, globulin, glucose and total protein recorded at 1.5% inclusion level is due to increase in feed intake and nutrient content of test materials and this suggest that *Phyllanthus amarus* extract can be supplemented as a nutrient source in broiler carcass and blood chemistry performance (Sanz *et al.*, 2000).

Table 3 Effect of *Phyllanthus amarus* extract on blood chemistry analysis of broiler finisher

Parameters	Different inclusion levels				SEM
	0%	1.0%	1.5%	2.0%	
Albumin (g/dl)	2.62	2.70	2.92	2.65	3.69
Globulin(g/dl)	0.45	0.54	0.71	0.54	8.05
Urea (mg/dl)	3.22	3.50	3.41	3.16	7.21
Creatinine (mg/dl)	1.41	1.61	1.67	1.41	3.87
Glucose (mg/dl)	343.7	345.4	381.2	341.5	8.67
Total protein(g/dl)	3.02	3.32	3.72	3.65	8.52

CONCLUSION

The results of this study show that administering *Phyllanthus amaruse* extract up to 1.5 and 1.0% inclusion level respectively can promote carcass and blood chemistry performance of broiler chickens. However further studies on how to increase the nutritional value of *Phyllanthus amarus* for monogastric animal in view of its abundance should be considered.

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