Tropentag 2017, Bonn, Germany
September 20-22, 2017

Conference on Future Agriculture: Social-ecological transitions and bio-cultural shifts

organised by the University of Bonn and the Center for Development Research, Bonn, Germany

Performance and Hematology of Broiler Starter Birds Fed Graded Levels of *Gongronema latifolium* (Utazi) Leaf Extract

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Abstract

The use of ethno-pharmacological plants as growth promoters in livestock has become necessary as a result of the problems of resistant strains and residue from antibiotic growth promoters. *Gongronema latifolium* has shown both bacteriocidal and bacteriostatic effects on microorganisms and this has necessitated the intention to investigate the effect of *Gongronema latifolium* extract on growth performance and hematology of broiler birds. Ninety six Agrited day old broiler chicks were randomly assigned into four treatment groups of 24 birds, each replicated three times with 8 birds per replicate in a Completely Randomised Design (CRD). The groups were fed four diets. Diet 1 (T1) contained no *Gongronema latifolium* and served as the control. Diets 2, 3 and 4 designated T2, T3 and T4, respectively contained 10 ml, 20 ml and 30 ml, respectively of *Gongronema latifolium* extract. The extract was produced by dissolving 100g of the dried and milled *Gongronema latifolium* leaf in one litre of water. Thereafter 10 ml, 20 ml, and 30 ml, respectively were decanted and dissolved in one litre of water, respectively for the various treatments. Feed and water were offered *ad-libitum* and data were collected on growth and hematological indices. Results showed that there were significant ($p<0.05$) differences in weight gain and feed intake and no difference ($p>0.05$) in hematological parameters. Birds fed T2 (10 ml) and T4 (30 ml) gained more ($p<0.05$) weight (29.8 g/d) and (29.2 g/d), respectively than those birds on the control diet (27.4 g/d). Similarly, birds fed T4 consumed more ($p<0.05$) feed (54.4 g/d) than those birds on the control and T2 diets (47.7 g/d) and (50.9 g/d), respectively. There were no significant ($p>0.05$) differences in FCR, water intake and blood parameters measured. These results showed that 10ml extract of *Gongronema latifolium* enhanced growth performance of broiler starter birds without any adverse effects on their blood chemistry.

Keywords: Broiler starter, *Gongronema latifolium*, growth, hematology

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Introduction

Poultry production has been described as the most economic means of reducing the animal protein shortfall in developing countries (Smith, 2001; Oluyemi and Roberts, 2007). At this time of global concern over antibiotic resistance in humans and animals due to residual effects from animal production (meat and egg), there arises the need for alternative, economically viable feed additives. Vegetable and other leafy plants are known to be rich in protein, essential fatty acids, vitamins and minerals and also possess antimicrobial (anti-viral, bacterial, fungal and parasitic) effects and as such they can be used in the feeding of poultry to enhance production (Alibi et al., 2008; Antai et al., 2009; Ikpeme et al., 2012). However, their incorporation into animal feeds is still negligible in view of the huge dependence on vitamin/ mineral premixes which are well adopted sources of micronutrients: vitamins and minerals (Alibi et al., 2008). The vegetable being considered in the present study is *Gongronema latifolium*. Commonly called 'utazi' and 'arokeke' in the south east and south west geopolitical zone of Nigeria, respectively *Gongronema latifolium* is a perennial edible shrub of the family, Asclepiadceae widely employed in Nigeria for various medicinal and nutritional purposes (Ugochukwu et al., 2003; Morebise *et al.*, 2002). The crop also has been identified to be nutritionally high in iron, zinc, vitamins, protein and amino acids (Agbo *et al.*, 2009). The high cost of supplementary sources of vitamins in broiler feed, motivated this research. It was against this background that an experiment was designed to study the effect of inclusion of *G. latifolia* leaf extract (GLLE) as a supplementary source of vitamins and minerals on growth performance and the hematology of broiler birds.

Methodology

Sources and Preparation of *G. Latifolia* Leaf

Fresh leaves of *G. Latifolia* were bought at Abakpa market Abakaliki, the leaves were washed with clean water to remove dirt and sand. The leaves was dried in a shade (air dried) for 10 days and grounded, and then 100g of the leaf meal was mixed in 1 liter of cold water and was distributed according to the different treatment. Treatments, 1, 2, 3, 4 with the graded levels of 0, 10, 20, 30ml which was made from 100g of leaf milled per liter of water.

Experimental Animal and Management

Seventy two (72) day-old chicks (DOC) were used for the study. The experimental animals were obtained from agric-international technology trade (AGRITED). The experiment was conducted using a completely randomized design (CRD). There were four treatments, each replicated three times. Each replicate contained six birds making a total of seventy-two birds in all. Treatment one (T_1) which was the control had 0% of *Gongronema latifolium* (utazi), treatment two (T_2) had 10% *Gongronema latifolium*, treatment three (T_3) had 20% *Gongronema latifolium* and treatment four (T_4) had 30% *Gongronema latifolium* (utazi).

Experimental Protocol At the fourth (4^{th}) week of the experiment one bird per replicate was randomly selected and blood samples were collected from the veins of each bird into sterilized bottles containing EDTA (ethylene diamine tetracetic acid) for hematological analysis. Hematological parameter determined were; hemoglobin concentration (HbC), packed cell volume (PCV), white blood cell count (WBC count), red blood cell count (RBC count) and erythrocyte indices: mean corpuscular hemoglobin (MCH). Mean corpuscular volume (MCV) and mean corpuscular hemoglobin concentration (MCHC). The PCV were determine by the micro-hematocrit method (Schalm et al., 1975; Mitruka and Rawnsely, 1977) using a micro-haematocrit centrifuge and reader (Hawksely and Sons ltd, England). The Hbc was determined using a hemoglobin meter method using an improved Neubauer counting chamber (Hawksely England) and avian RBC and WBC diluting fluids as described by Campbell and Coles (1986) The MCV, MCH and MCHC were calculated using standard formulae (Mitruka and Rawnsely, 1977; Thrall and Weiser, 2002)

Statistical Analysis: Data collection was subjected to analysis of variance (ANOVA) according to Steel and Torrie (1980) and significant differences separated using Fishers Least Significant Difference (F-LSD) as outlined by Obi (2001)

Results and Discussions

Growth Performance Traits : The results on the effect of *Gongronema latifolium* (Utazi) leaf extract on growth performance of broiler starter are presented in Table 1. There was a significant ($P< 0.05$) difference in the final body weight (FBN), body weight gain (BWG), daily weight gain (DLG), daily feed intake (DF1), total feed intake (TF1). There was no significant ($P>0.05$) difference in daily water intake (DW1) and feed conversion ratio (FCR).

Table 1: Growth Performance of Broiler Starter fed *Gongronoma Latifolium* (utazi) leaf extract.

Parameters	T1	T2	T3	T4	SEM
Initial body weight (g)	90.67	91.33	90.33	90.33	1.13
Final body weight (g)	856.60^{b}	923.27^{a}	864.98^{b}	907.92^{a}	14.06
Body weight gain (g)	765.93^{b}	833.27^{a}	774.65^{b}	817.59^{a}	15.02
Daily weight gain (g)	27.35^{b}	29.76^{a}	27.67^{b}	29.20^{a}	0.54
Daily feed intake (g)	47.66^{c}	50.89^{b}	52.20^{ab}	54.35^{a}	1.20
Total feed intake (g)	1334.48^{c}	1424.83^{b}	1461.69^{ab}	1521.71^{a}	33.71
Daily water intake (ml)	155.59	155.59	149.33	151.97	5.66
Feed conversion	1.74	1.71	1.89	1.88	0.07

^{abc} Means on the same row followed by different superscript are significantly different (P< 0.05). SEM= Standard error of mean.

Birds on T_2 (923.27g) recorded a significantly (P<0.05) higher final body weight compared to those fed treatments T3 (864.98g) and T1, (856.60g), respectively. The body weight gain of T_2 (29.76g) is superior (P<0.05) to those of T_3 (27.6g), and T_1 (27.35g), respectively. Birds on T_4 consumed significantly more feed (1521.71g) than those on T_2 (1424.83g) and T_1 (1334.48g), respectively during the experimental period. Daily feed intake of birds on T_4 (54.35g) was superior to those of birds on T_2 (50.89g) and T_1 (47.66g), respectively. The daily water intake on all treatments did not differ statistically. The feed conversion ratio of birds on all treatments were not significantly (P>0.05) different even though there were marginal differences. Birds fed T_2 (GL10ml) gained significantly higher body weight gain than those in other treatments. The positive effect of G. *latifolium* on growth performance of the test groups suggest that the inclusion of *Gongronema latifolium* extracts in the broiler diet was quite beneficial. Okafor (1983), Okafor (2005) and Kubmarawa *et al*. (2001) had reported that G. *latifolium* is one of the cheapest and most available sources of important proteins, vitamins, mineral and essential amino acids that can boost the physiological status of birds and promote their growth. The significant variation recorded between the test material and non-test material (control) indicates that *Gongronema latifolium* stimulated the appetite of the birds sufficiently to have produced a significant effect. The findings of the this present study is line with the report of Ani *et al.* (2013) who reported significant difference in the feed intake of broiler birds fed varying dietary levels of *Gongronema latifolium* leaf meal. The significant increase in the feed intake might be as result of the fact that *Gongornema latifolium* leave is rich in vitamins, minerals, zinc, protein and amino acids (Agbo *et al.*, 2009) which also stimulated the appetite of the birds.

Hematological indices: The results on the effect of *Gongronema Latifolium* (utazi) leaf extract on hematological indices of broiler starter are present in Table 2: There were no significant differences (P>0.05) in all the hematological parameters evaluated.

Table 2: Hematological indices of broiler fed *Gongronema latifolium* (utazi) leaf extract.

Parameters	T1	T2	T3	T4	SEM
Packed cell volume (PCV)%	24.33	24.00	27.33	27.67	1.98
Hemoglobin count (g/dl)	7.87	7.17	8.07	8.97	0.63
Red blood cell (RBC)x10^{12}/l	2.30	2.00	2.57	2.83	0.24
White blood cell (WBC)x10^{9}/l	19.87	19.03	21.37	24.47	1.51
Mean corpuscular volume (Fl)	107.00	120.67	106.67	96.00	5.89
MCH (pg)	35.47	36.43	31.57	31.50	2.90
MCHC (pg)	32.83	29.90	29.40	32.20	1.95

MCH =mean corpuscular hemoglobin; MCHC= mean corpuscular hemoglobin concentration SEM= standard error of mean;

The hematological parameters showed that the birds on T_4 (27.67%) had a marginal increase in packed cell volume compared to T_3 (27.33%), T_1 (24.33%) and T_2 (24.00%) among treatment means. Hemoglobin count of birds fed T4, T1, and T2 are (8.07g/dl), (7.87g/dl) and (7.17g/dl), respectively. The red blood cell (RBC) on T_4 ($2.83x10^{12}$ /l) increased numerically compared to T_3 ($2.57x10^{12}$/l), T_1 ($2.30x10^{12}$/l) and T_2 ($2.00x10^{12}$/l) which recorded the lowest. The white blood cell (WBC) of T_4 ($24.47x10^{9}$/l) showed a marginal increase compared to T_3 ($21.37x10^{9}$/l), T_1 and T_2 ($19.3x10^{9}$/l) among treatment groups. The mean corpuscular hemoglobin of T_2 (36.43pg), had the highest numerical value compared to T_1 (35.47pg), T_3 (31.57pg) and T_4 (31.50pg), respectively. There were non-significant differences ($P>0.05$) in all hematological parameters evaluated. These results disagrees with the findings of Machebe *et al.* (2011), who reported that inclusion of oral *Gongoronema latifolia* leaf meal significantly affected the hematological parameters; packed cell volume, hemoglobin count, white blood cell, red blood cell, mean corpuscular hemoglobin concentration, mean corpuscular hemoglobin and mean corpuscular volume of the broiler. The mean values of hematological parameters, viz; PCV (27.67 - 24.00%), Hb (8.97-7.17g/dl), WBC (24.47 - 19.03 x 10^{9}/L), RBC (2.83 – 2.00 x 10^{12}/L), MCV (120.67 – 96.00fl), MCH (36.43 – 31.50 pg) and (MCHC. 32.83 – 32.20g/d) obtained in this study were within the normal range for broiler birds as reported by (Mitruka and Ransley, 1977). The normal values of the birds among the treatment suggest that, the nutritional status and immune system of the birds were adequate and the non- significant differences observed in this present result, indicated that the presence of Gongro*nema latifolium* leaf extracts helped to stabilized the blood component.

Conclusion and Outlook

This study has revealed the positive effect of *Gongrnema latifolium* leaves extract in poultry production. However, the results presented revealed that up to 10ml of *Gongronema latifolium* leaf extract can be included in broiler starter diet to enhance growth performance and hematological status without adverse effect. It can therefore, be recommended as alternative growth promoter in broiler diet but more research should be carried out to ascertain the appropriate inclusion levels and processing methods needed for better performance.

References

Agbo, C. U. Umeh, P.C. Obi, I.U (2009). Genetic variability in protein and amino acid composition in leaves of some Gongronema Latifolia clones. Food Global science Books (Japan): 3 (1): 98-106.

Alabi, O.M. et al. (2008). Physiological response of broiler chickens to oral supplementation with Telifaria occidentalis leaf extract at finisher phase proceedings of the 13th Annu. Conf. Anim. Sci. Assoc. Nig. (ASAN). Sept. 15-19 ABU Zaria. PP 114-117.

Antai, A.B, et al., (2009). Phytochemistry and some haematologicl changes following oral administration of ethanoic root extract of *Gongronema Latifolium in rats. Nig. J. Physiol. Sci.* 24(1):79-83.

Ikpeme, E.V. et al. (2012). Phy to chemical screening and hematological evaluation of parkia biglobosa and Gongronema Latifoliun. J. Basic APPl. Res. 2 (3): 2599-2606.

Kubmarawa, D. et al. (2007). Preliminary Phyto-chemical and Antimicrobial screening of 50 medical plants from Nigeria. Afri. J. Biotechnol. Vol. 6 (14) pp 1680-1696.

Machebe, N. S. et al.,(2011). Oral administration of Gongronema latifolia leaf meal: Implications on carcases and haematological profile of broiler Finishers raised in the humid tropics. *African journal of Biotechnology* 10 (30):5805

Mitruka, B.M. and Rawnsley, H. M. (1977), clinical Biochemical and Heaematological Reference values in normal Experimental Animals, Masson, New York. Pp. 42-45.

Morebise O, et al., (2002). Antiinflammatory property of the leaves of *Gongronemalatifoslium.* Phytotherapy Research. 16:75-77.

Okafor J.C. (1983). Horticultural promising indigenous wild plant species of the Nigeria forest zone. Acts. Horticulture 123pp 165-177.

Okafor, J.C. (2005). Conservation and use of traditional vegetables from woody forest spices in south Eastern Nigeria. Fame Agricultural center, Enugu, Nigeria. www. Agri. Cigar. Org

Ugochukwu, N. H., Babady, N. E. and coboune, M. (2003). The effect of Gongronema Latifolium leaf extracts on sceum lipid profile and oxidative stress of hepatocutes of diabetic rats. J. Bio. Sci. 28(1): 1-5.