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RESPONSE OF BROILER CHICKS TO VARYING DIETARY LEVELS OF *GONGRONEMALATIFOLIUM* LEAF MEAL

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Abstract

A four-week study was conducted to determine the response of starter broiler birds to varying dietary levels of *Gongronema latifolium* leaf meal (GLLM). Ninety-six (96) 14-day old unsexed commercial broiler chicks (Anak strain) were randomly divided into four treatment groups of 24 birds each in a completely randomized design (CRD). The treatments received varying levels of*G. latifolium* leaf meal (GLLM) per 25 kilogramme of feed as follows: treatment 1 (T1), 0g; treatment 2 (T2), 100g; treatment 3 (T3), 150g and treatment 4 (T4), 200g. Each treatment was replicated two times with 12 birds per replicate. Feed and water were supplied *ad libitum* to the birds. Results indicated that significant ($p<0.05$) differences existed among treatments in the values of total weight gain , daily weight gain, feed conversion ratio, protein efficiency ratio and feed cost per kg gain of birds fed dietary GLLM. However, there were no significant ($p > 0.05$) differences in the final body weight of the starter broiler birds. It was concluded that dietary inclusion of GLLM had no adverse effect on growth performance of the starter broiler birds.

Key words: Starter broilers, diet, *Gongronema latifolium* leaf meal, growth, response.

Introduction

The need for animal protein by humans cannot be overemphasized. Animal protein contains large amounts of the essential amino acids needed for normal body function .The level of consumption of meat and animal protein in Nigeria is estimated at 8g per caput per day, which is about 27g less than the minimum requirement recommended by the Food and Agricultural Organization (FAO, 2008). This has encouraged greater interest in fast growing animals with short generation intervals like pigs, rabbits and poultry. Poultry in particular is considered to be a means of livelihood and a way of achieving a certain level of economic independence in Nigeria (Oluyemi and Roberts, 2007). However, one of the major constraints in poultry production in Nigeria is the prevalence of poultry diseases which result in high mortality rate among the flocks. In an effort to combat poultry diseases and nutrient deficiencies in poultry, there has been an increased interest by poultry farmers on the search for leafy vegetables that are ethno-medicinal, good sources of vitamins, minerals and phytochemicals and that can boost the growth of chickens (Alabi *et al*., 2008). One of the leafy vegetables being considered in this study as a source of prebiotics is *Gongronemalatifolium* leaf meal. *Gongronema latifolium*, commonly called 'utazi' and 'arokeke' in the south eastern and south western parts of Nigeria, respectively is a tropical rainforest plant primarily used as spice

and vegetable in traditional folk medicine. This plant is propagated by seed (Agbo and Obi, 2006). It is reported to be nutritionally high in iron, zinc, vitamins and proteins (Okafor, 2005). Ruminants raised extensively derive most of their nutritional requirements from the green pastures by virtue of their grazing behaviour. However, this is not possible with non-ruminants especially when kept intensively. The present study was therefore conducted to evaluate the response of starter broiler birds to varying dietary levels of *Gongronema latifolium* leaf meal.

Materials and Methods

The study was conducted at the Poultry Unit of the Department of Animal Science Teaching and Research Farm, University of Nigeria, Nsukka. The study lasted four weeks. The materials that were used as feed ingredients to formulate the experimental diets for the research were procured from Nsukka, Orba and Enugu in Enugu State, Nigeria. Most of the *Gongronema latifolium* leaves were harvested from household gardens and fields, while some were procured from the market and dried inside an open airy room(at 32^0C) for 4-5 days to reduce the moisture content. The leaves ground into powder to pass through a 1mm screen to produce the meals that were incorporated into the broiler starter and finisher diets. The ground materials were stored separately in jute bags until they were used to formulate the experimental diet. Starter broiler diet was formulated and the test material added as a supplement to 25kg diet to constitute four treatments as follows: treatment 1 , 0g/25kg diet; treatment 2 , 100g/25kg diet; treatment 3 ,150g/25kg diet and treatment 4 , 200g/25kg diet . The composition of the basal diet is shown in Table 1.

Table 1: Percentage composition of the experimental starter broiler diet

Ingredients	Starter broiler diet
Maize	42
Wheat offal	7
Soybean meal	14
Groundnut cake	20
Palm kernel cake	10
Fish meal	2
Bone meal	4
Salt	0.25
Vitamin/mineral premix*	0.25
Methionine	0.25
Lysine	0.25
Total	100

Calculated analysis:

Crude protein (%)	23.00
Energy(Mcal/kg ME)	3.36
Crude fibre (%)	3.61
Cost of 25kg of feed(₦)	3,500
Cost of 1kg of feed(₦)	140

*Vit A - 10,000.00 iu., D3-2,000 iu., B1-0.75g., B2-5g., Nicotinic acid - 25g., Calcium pantothenate 12.5g., B12-0.015g., K3-2.5g., E-25g., Biotin - 0.050g., Folic acid -1g., Manganese 64g., Choline chloride 250g., Cobalt-0.8g., Copper 8g., Manganese 64g., Iron -32G., Zn-40g., Iodine-0.8g., Flavomycin-100g., Spiramycin 5g., Dlmethionie-50g, Selenium 0.6g., Lysine 120g., BA.

Management of Experimental Animals

A total of ninety-six day-old unsexed commercial broiler chicks (Anak strain) were used for the study. The birds were brooded together for two weeks in a deep litter system. Kerosene lamps and electric bulbs were used as sources of heat and light. At two weeks of age, the birds were allotted randomly into four treatment groups (treatment 1 , 0g/25kg diet; treatment 2 , 100g/25kg diet; treatment 3 ,150g/25kg diet and treatment 4 , 200g/25kg diet), each having 24 birds in a completely randomized design (CRD). Each treatment group was divided into two replicates of 12 birds each. Birds in each replicate were housed in experimental pens measuring 3 x 2 meters, containing deep litter of fresh wood shavings in an open sided building. The birds were properly vaccinated against New Castle disease, Gumboro disease and fowl pox as and when due, following standard vaccination procedures. Prophylactic treatment against coccidiosis was also given to the birds using Embazin forte. This was done when the birds were two weeks of age, and intermittently, when necessary. Feed (broiler starter diet) and water were supplied *ad libitum* throughout the four weeks experimental period. Birds in each replicate were weighed at the beginning of the experiment and on weekly basis thereafter to determine the weight gain of birds. Feed intake was recorded daily and was determined by the weigh-back technique and involved obtaining the difference between quantity of feed offered and the left over the following morning. Feed conversion ratio was calculated from the data on feed intake and weight gain as the number of grams of feed taken per gram of weight gained over the same period.

Statistical Analysis

Data collected were subjected to analysis of variance (ANOVA) for completely randomized design (CRD) using a Statistical Analysis System (SAS, 2006*).* Significant means were separated using Duncan's New Multiple Range Test (Duncan, 1955).

Results and Discussion

Table 2 shows the growth performance of starter broilers fed diet containing varying levels of *Gongroinema latifolium*. Dietary treatments had significant ($p<0.05$) effects on the total weight gain (TWG), daily weight

Table 2: Growth performance of broiler chicks fed varying dietary levels of *G. latifolium* leaf meal

	Treatments				
Parameters	**T1(0g/25kg)**	**T2(100g/25kg)**	**T3(150g/25kg)**	**T4(200g/25kg)**	**SEM**
Initial body weight(kg)	0.13	0.14	0.13	0.13	0.002
Final body weight(kg)	0.62	0.60	0.60	0.60	0.004
Total weight gain(kg)	0.50^{a}	0.47^{ab}	0.47^{ab}	0.48^{ab}	0.005
Daily weight gain(g)	17.68^{a}	16.61^{b}	16.79^{ab}	16.97^{ab}	0.18
Daily feed intake(g)	29.95	30.23	30.14	30.20	0.06
Total feed intake(g)	119.82	120.90	120.53	120.78	0.22
Feed conversion ratio	1.70^{b}	1.82^{a}	1.80^{a}	1.78^{ab}	0.02
Protein efficiency ratio	2.45^{a}	2.29^{b}	2.32^{ab}	2.34^{ab}	0.03
Cost of daily feed intake(₦)	4.20	4.23	4.22	4.22	0.01
Cost of total feed intake(₦)	16.77	16.92	16.88	16.91	0.03
Feed cost per kg gain(₦)	237.30^{b}	254.80^{a}	252.00^{a}	249.20^{ab}	2.87
Mortality(%)	4.15	8.30	4.15	4.15	1.51

^{ab} Means on the same row with different superscripts are significantly (P<0.05) different.

SEM = Standard error of the mean

gain (DWG), feed conversion ratio (FCR) protein efficiency ratio (PER) and feed cost per weight gain (FC/kg). There were no significant (p>0.05) differences among treatments in final body weight (FBW) daily feed intake (DFI), total feed intake (TFI), cost of daily feed intake (CDFI), cost of total feed intake (TFI) and mortality. Birds in treatment 1(control) had significantly (p<0.05) higher TWG, DWG, and PER (0.05kg, 17.68g and 2.45g, respectively) than those on treatment 2 which had TWG, DWG and PER values of 0.47kg, 16.61g, and 2.29g, respectively. Birds on treatments 1, 3 and 4 had similar TWG, DWG and PER value. Birds on treatments 2, 3 and 4 also had similar TWG, DWG and PER values. Birds on treatments 2 and 3 had significantly (p<0.05) higher FCR (1.82g and 1.80g, respectively) than those on treatment 1 which had FCR value of 1.70g. Birds on treatments 2 and 3 had significantly (p<0.05) higher FC/kg (₦254.80 and ₦252.00, respectively) than those on treatment 1 which had FC/kg the value of ₦237.30. Birds on treatments 2, 3 and 4 had similar FCR and FC/kg values. Birds on treatments 1 and 4 also had similar FCR and FC/kg values. As observed in Table 2, no significant (p>0.05) differences existed among treatments in final body weight; body weight gain, average body weight gain whereas there were significant differences in feed conversion ratio and protein efficiency ratio of broiler chicks. The observed differences appeared to be dose dependent. However, birds on treatment 2 had the highest feed conversion ratio and protein efficiency ratio. It does seem that the growth performance of chicks was not affected by the increasing levels of GLLM. The similarity between treated groups and the control suggests that the inclusion of *Gongronema latifolium* in starter broiler diet was quite beneficial (Ani *et al*., 2013). Okafor (2005) and Kubmarawa (2007) had reported that *Gongronema latifolium* is one of the cheapest and most available sources of important proteins, vitamins, minerals and essential amino acids that can boost the physiological status of birds and promote their growth.

The inclusion of *Gongronema latifolium* in the broiler's starter diets might have resulted in good gut and overall health status, efficient nutrient utilization, normal development and growth response of the treated chicks. The reduced mortality tends to corroborate the report of Mensah *et al*. (2008) that *Gongronema latifolium* is known to contain important compounds that can strengthen the immune system and serve as antibiotics for the treatment of common pathogenic strains in birds. Agbo *et al*. (2005), Ugochukwu *et al*. (2003) and Kubmarawa *et al*. (2007) had reported that *Gongronema latifolium* can be used in the prevention and treatment of many diseases that can cause death in farm animals. It does appear therefore, that *Gongronema latifolium* can be included in starter broiler diet as an additive to prevent, reduce or manage the incidence of disease causing organisms in growing chicks. The inclusion of *Gongronema latifolium* in starter broiler diet may also help to minimize the cost of medication by the rural or poor farmers since the vegetable is readily available and can be obtained at little or no cost to the farmer.

Conclusion

The results obtained in the present study show that inclusion of GLLM in the diet of starter broilers had no adverse effect on growth performance of the broiler birds.

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GROWTH PERFORMANCE OF BROILER CHICKS FED VARYING DIETARY LEVELS OF *OCIMUM GRATISSIMUM* LEAF MEAL

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