



GROWTH AND HAEMATOLOGICAL RESPONSES OF BROILER FINISHER BIRDS TO DIETS WITH GRADED LEVELS OF GINGER

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Abstract

A feeding trial of 28 days was conducted to determine the effect of inclusion of graded levels of ginger in broiler finisher diets on the growth and haematological parameters. Five diets were formulated such that they all have the same levels of ingredients with graded levels of ginger meal added at 0 (T₁), 15 (T₂), 30 (T₃), 45 (T₄) and 60 g/Kg (T₅) respectively. One hundred and five, 28 days - old “Fidan” broiler birds were randomly assigned in a completely randomized design (CRD) experiment to the five diets with twenty one birds per treatment. Each treatment was replicated thrice with seven birds per replicate. The finisher phase lasted for 28 days. Results showed that ginger inclusion levels significantly ($P < 0.05$) influenced the average feed intake, final live weight, and average weight gain, feed conversion ratio, haemoglobin (Hb) concentration and packed cell volume (PCV). All parameters tended to improve with the increase dietary level of ginger meal. Ginger levels did not significantly ($P > 0.05$) influence the red blood cell (RBC) and white blood cell (WBC) counts. The study concluded that ginger meal should be included at 45g/kg feed to improve feed utilization, growth performance and haematological parameters of broiler finisher birds.

Key words: Ginger, growth, blood, broiler, nutrient

Introduction

Expensive and substandard feed is commonly a major constraint in a poultry business. Many farmers have advocated the use of antibiotics as a ware augmenting these effects. However, according to Guo *et al.* (2004) continuous feeding of antibiotics as growth stimulants to chickens results in a decreased growth response. Therefore there is need to explore possible alternative to ensure sustainable productivity.

Spices are not just health stimulants, they are known to have many health promoting properties among which is the improvement in gastro –intestinal micro –environment of birds leading to enhancement in nutrients utilization and ultimately increase in productivity (Chatterjee and Agrawala, 2002). A spice that can be exploited in this direction is ginger, which is high in calcium, iron, magnesium, manganese, potassium, selenium, vitamins B₆, C and E. It is also rich in protein and dietary fibre (Lynn and Truc, 2010). Ginger has been shown to be used in several therapeutic applications such as anthelmintic, laxative, anti - anorexic and anti - inflammatory (Frankie *et al.*, 2011). In the food industry, it is used as a flavouring agent and a preservative (Lynn and Truc, 2010). This study was therefore designed to investigate the effect of graded levels of ginger in broiler finisher diets on the growth parameters and haematological indices.

Materials and methods

Preparation of ginger

Fresh ginger rhizomes were purchased from Watt market Calabar, Cross River State, Nigeria .They were washed and air- dried for two weeks, thereafter milled into 1mm sieve size with a hammer mill and kept in an air tight container .

Animals and their management

Five treatments were formulated, all with the same quantity of ingredients but the dietary treatments were added with graded levels of ginger meal at 0, 15, 30, 45 and 60 g/kg of feed for diets T₁, T₂, T₃, T₄ and T₅ respectively. A total of 105, 4weeks old “Fidan” broiler birds were randomly assigned to the five treatments, such that each treatment had 21 birds, which were further subdivided into three replicates with each replicates having 7 birds. The birds were given feed and water *ad libitum* for 28 days .The crude protein and metabolizing energy of the diets were 21.07% and 3,100.20 Kcal/kg respectively (Table 1).



Collection of blood samples

At the end of the experiment, blood samples were collected through the jugular vein of the birds (after the birds were without feed for 12 hours but were allowed access to water) into ethylene diamine tetra-acetate (EDTA) bottles, to determine the packed cell volume (PCV), haemoglobin (Hb), red blood cell (RBC) and white blood cell (WBC) counts respectively using standard laboratory procedures.

Data analysis

All data were statistically analyzed using the analysis of variance procedure of Steel and Torrie (1980). Significant means were separated using the Duncan's New Multiple Range Test (Duncan, 1955).

Results and Discussion

The feed intake (Table 2) increases ($P < 0.05$) significantly as the dietary levels of ginger meal increased in the diets. This observation agrees with the report of Frankie *et al.* (2009); Lynn and Truc (2010), who reported significant increment in feed intake of birds, fed diets containing ginger; which they attributed to the improvement in appetite and flavor as a result of ginger meal inclusion. The average daily weight gain and the final live weight showed similar trend with feed intake as both parameters significantly ($P < 0.05$) improved as the dietary levels of ginger increased across dietary treatments. The improvements in final live weight and average weight gain of birds in diets with ginger also agrees with the observation of Borazjani - Zadeh *et al.* (2011); Which was attributed to the anti-helminthic and antibacterial properties of ginger. Reduction in negative intestinal bacteria improves feed utilization and ultimate growth in broiler birds (Nsa *et al.*, 2010). However, birds in diets with 45 and 60 g/kg did not show any significant differences. Feed conversion ratio improves significantly ($P < 0.05$) with increase in dietary ginger levels, this could be due to the good condition of digestive tract (walls) which ginger is known for (Nsa *et al.*, 2009) due to improvement in feed utilization, where negative bacteria were reduced in intestinal walls of birds. Among the haematological parameters, Hb and PCV showed significant differences ($P < 0.05$), the values increased with dietary levels of ginger. However, they were within values recommended for healthy birds; likewise red blood cell and white blood cells though they did not show any significant ($P > 0.05$) difference but were within the ranges recommended for healthy birds. This observation could be so because the feed were balanced in nutrients. Dietary deficiency of iron, copper, vitamins and amino acids are associated with decrease in the quantity of haemoglobin (Frandsen, 1981).

Conclusion

The results of this study revealed that ginger meal could be included in broiler finisher diets. However, the inclusion level should not be more than 45g/kg of feed as above this level they might not show any significant improvement in the growth and haematological parameters.

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Table 1: Gross composition of experimental diets

Ingredients	Inclusion levels of ginger meal				
	T ₁ (Control-0g/kg)	T ₂ (15g/kg)	T ₃ (30 g/kg)	T ₄ (45g/kg)	T ₅ (60g/kg)
Maize	60.00	60.00	60.00	60.00	60.00
Soybeans	26.50	26.50	26.50	26.50	26.50
Wheat offal	7.50	7.50	7.50	7.50	7.50
Fish meal	2.50	2.50	2.50	2.50	2.50
Bone meal	2.70	2.70	2.70	2.70	2.70
Salt	0.20	0.20	0.20	0.20	0.20
Lysine	0.20	0.20	0.20	0.20	0.20
Methionine	0.20	0.20	0.20	0.20	0.20
Vit/min premixes	0.20	0.20	0.20	0.20	0.20
Total	100.00	100.00	100.00	100.00	100.00
Calculated analysis					
Crude Protein %	21.07	21.07	21.07	21.07	21.07
ME(kcal/kg)	3100.20	3100.20	3100.20	3100.20	3100.20

Table 2: Growth and haematological responses of broiler birds fed diets containing graded levels of ginger rhizome meal

Parameters	T ₁ (Control)	T ₂	T ₃	T ₄	T ₅	SEM
Initial weight(g)	570.22	571.00	568.20	566.90	570.10	3.65
Final Live Weight(g)	2118.66 ^c	2122.00 ^c	2308.16 ^b	2481.45 ^a	2490.08 ^a	6.90
Ave. Daily Weight gain(g)	87.60 ^c	91.46 ^c	98.15 ^b	106.55 ^a	108.70 ^a	2.32
Ave. Daily feed intake(g)	189.22 ^b	192.17 ^b	201.44 ^{ab}	206.72 ^{ab}	208.91 ^a	1.98
Feed Conversion Ratio	2.16 ^a	2.10 ^a	2.05 ^a	1.94 ^b	1.92 ^b	0.11
Mortality (%)	1.00	0.00	0.20	0.00	0.01	0.01
Haematological indices						
Hb (g/dl)	14.08 ^e	14.91 ^d	15.02 ^c	15.26 ^b	15.89 ^a	1.11
PCV (%)	40.01 ^e	46.23 ^d	49.15 ^c	52.69 ^b	56.00 ^a	3.89
RBC (x10 ¹² /L)	12.13	15.66	11.25	11.05	10.99	4.56
WBC (x10 ⁹ /L)	11.55	10.62	10.81	11.05	10.99	1.87

^{a,b,...d} Means on the same row with different superscripts differ significantly (P<0.05).