

GROWTH PARAMETERS OF BROILER CHICKS FED GRADED LEVELS OF DIETARY GARLIC (*Allium sativum* L.)

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ABSTRACT

This study was designed to evaluate the growth indices of broiler chicks fed graded levels of dietary garlic. A total of two hundred and ten (210) four week-old mixed sex broiler chicks were used for the experiment that lasted for four weeks. The birds were grouped into five groups with three replicates in a Complete Randomized design. A broiler starter diet was formulated to which graded levels of garlic meal was incorporated at 0.0, 5.0, 7.5, 10.0, and 10.25 g/kg to give the various treatment groups T1 (Control), T2, T3, T4 and T5 respectively. Feed intake, body weight, body weight gain, feed conversion ratio and mortality were the response criteria. Feed intake was influenced by dietary garlic during the first week of the experiment. Chicks fed diet with inclusion of 7.5g/kg had the lowest feed intake (19.68g/bird/day). Weekly body weight and body weight gain were not influenced ($p>0.05$) by dietary garlic during the starter phase. It was concluded that garlic can be included in broiler starter diets up to 10g/kg as a growth promoter.

Key words: Body weight, feed conversion ratio, garlic, broiler, starter

INTRODUCTION

Garlic (*Allium sativum*), a spice and medicinal plant of diverse importance are well cultivated in Nigeria (Miko, 2000). Usually this spice is cultivated under irrigation and mainly for fund generation (Kilgori, 2004). It is widely used in all parts of the world as a spice and herbal medicine for the prevention and treatment of a variety of diseases (Konjucfca *et al.*, 1997). They further noted that garlic possess antimicrobial, antioxidant, antiviral and antifungal properties.

Garlic supplemented to broiler chicks diet has been recognized for its strong stimulating effects on the immune system in addition to its positive effects on digestion in birds due to the very rich aromatic essential oil content of garlic (Demir *et al.*, 2005). Findings by Fadlalla *et al.* (2010) showed that garlic at 0.3% in broiler feed resulted to a significant positive effect on growth performance and carcass yield. Freitas *et al.* (2001) and Bampidis *et al.* (2005) obtained similar results in their studies with broilers chickens and they concluded that higher concentrations ranging between 1 and 2% were actually more effective than lower doses. Their observations confirmed the report of Doley *et al.* (2009), who found that supplement of garlic and turmeric powder at 0.25% did not influence broiler chickens' feed intake and live weight gain compared to the control.

Although, many studies have been conducted with garlic in broiler chickens diet, the reports obtained from these studies were not consistent. This study was therefore designed to evaluate the growth indices of broiler chicks fed graded levels of dietary garlic.

MATERIALS AND METHODS

The study was conducted at the Poultry Unit of the Teaching and Research Farm of the Department of Animal Science, University of Maiduguri, Borno state, Nigeria. Maiduguri is located between latitude 11° 15 and 12 ° north, longitude 30° 05 and 14° east and at an altitude of 345m above sea level (Ugherughe and Ekedolum, 1986). A total of two hundred and ten (210) day old mixed sex broiler chicks were purchased from a reputable hatchery and reared to four weeks of age before they were used for the experiment. Garlic was purchased from a local market, it was peeled and air dried for 5 – 6 days after which it was milled and subsequently incorporated into the experimental diets. A broiler starter diet was formulated as shown in Table 1 to which graded levels of garlic meal was incorporated at 0.0, 5.0, 7.5, 10.0, and 12.5 g/kg to give the various treatment groups T1 (Control), T2, T3, T4 and T5 respectively. The diets were fed to five treatments of 42 birds per treatment each replicated three times. Feed intake,

weekly body weight, body weight gain, feed conversion ratio and mortality were the response criteria. During the four weeks experimental period feed and water were offered *ad libitum*. All data collected were subjected to analysis of variance (ANOVA) in a completely Randomized Design. Where means differ, Least Significant Difference (LSD) was used to separate them.

RESULTS AND DISCUSSION

Table 2 shows the effect of inclusion levels of dietary garlic on productive performance of starter broiler chickens. Feed intake was influenced by dietary garlic during the first week of the experiment. Chicks fed diet with inclusion of 7.5g/kg had the lowest feed intake although the intake was similar to those on 10g/kg. Birds fed the highest level of dietary garlic had similar intake with the control group. In the subsequent weeks, however, dietary garlic had no effect on feed intake. This is contrary to the observation Javandel *et al.* (2008) who reported a higher feed intake with increased level of inclusion of dietary garlic during the starter phase of broiler chicken rearing.

Body weight was not influenced by dietary garlic during the starter phase of broiler chicken rearing. Except in week two where bird in the control and 10g/kg groups had higher weight gain than the other groups. This confirms the report of Ashayerizadeh *et al.* (2009) who demonstrated that body weight and body weight gain did not change when garlic was added in broiler chicken diet. Dietary ginger significantly influenced feed conversion ratio during the third week while in the other weeks, the means were all similar among the treatment groups. The improved FCR in T5 although similar ($p>0.05$) to the control (T1), agrees with the report of Mahmood *et al.* (2009) who concluded that a basal diet containing 0.5% garlic improved FCR of broiler chicks.

CONCLUSION

It was concluded that garlic can be included in broiler starter diets as a growth promoter. Farmers can include up to 10g/kg garlic (*Allium sativum* L.) in broiler starter diet for improved performance.

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Table1: Ingredient composition of experimental diet

Ingredient	Percentage
Sorghum	45.00
Maize	10.00
Wheat offal	7.00
Full fat soya bean	12.00
Groundnut cake	18.00
Fish meal	5.00
Bone meal	2.00
Min-Vit Premix	0.50
NaCl	0.30
Methionine	0.20
Total	100.00
Calculated analysis	
Crude protein (%)	23.35
Crude fibre (%)	3.20
ME (kcal/kg)	2883.30

ME – Metabolizable Energy

Table 2: Productive performance of broiler chicks fed graded levels of dietary garlic (*Allium sativum*)

Age (Weeks)	T1	T2	T3	T4	T5	SEM
Average Daily Feed Intake						
1	22.55 ^{ab}	22.55 ^{ab}	19.68 ^c	21.13 ^{bc}	24.28 ^a	0.71 [*]
2	41.15	40.64	42.86	39.80	41.07	1.78 ^{NS}
3	50.54	52.41	47.50	50.00	50.27	2.36 ^{NS}
4	79.22	79.96	78.25	81.00	80.88	3.68 ^{NS}
Average Weekly Body Weight						
1	147.76	140.40	141.62	144.52	142.52	2.79 ^{NS}
2	281.29	275.74	273.62	268.36	278.05	8.41 ^{NS}
3	471.67	433.21	441.79	451.86	444.41	17.40 ^{NS}
4	658.99	623.92	632.62	652.90	634.18	18.96 ^{NS}
Average Daily Weight Gain						
1	9.18	8.45	8.73	6.33	8.79	0.87 ^{NS}
2	19.87 ^a	18.07 ^{ab}	18.50 ^{ab}	20.35 ^a	17.51 ^b	0.73 [*]
3	25.99	24.45	24.05	21.99	27.11	1.86 ^{NS}
4	27.47	26.30	27.55	28.25	27.56	1.51 ^{NS}
Feed conversion ratio						
1	2.48	2.66	2.32	3.57	2.80	0.47 ^{NS}
2	2.07	2.25	2.34	1.95	2.37	0.13 ^{NS}
3	1.96 ^{ab}	2.17 ^{ab}	1.98 ^{ab}	2.29 ^a	1.86 ^b	0.11 [*]
4	3.00	3.09	2.84	2.86	2.94	0.16 ^{NS}

T1 (Control) – 0g/kg, T2 - 5.0 g/kg, T3 - 7.5g/kg, T4 - 10.0g/kg, and T5 – 12.5 g/kg; SEM – Standard error of mean; ^{a,b,c,.....}Means in same row bearing different superscripts differ significantly (p<0.05)