

## Herbal effects of ginger in turkey poult

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**Target Audience:** Animal Nutritionist, Poultry Farmers and Researchers

### Abstract

The study was conducted to investigate the effects of ginger supplementation on growth performance and serum biochemistry of turkey poult. A total of 96 two-weeks old American bronze turkey poult were randomly allocated into four dietary treatments. 24 poult per treatment replicated thrice with 8 turkey poult per replicate in a completely randomized design (CRD). The turkey poult were given a basal diet supplemented with 0, 0.2, 0.4 and 0.6% ginger powder during the 42 days of the experiment. Growth performance and serum biochemistry were determined. The final liveweight, body weight gain and feed conversion ratio improved in treatment groups especially among turkey poult fed diet containing 0.6% of ginger powder. The supplementation of ginger powder at 0.6% reduced cholesterol, triglyceride, low density lipoprotein, ALT, AST values and increased the high density lipoprotein value. Supplementing turkey poult with ginger enhanced the growth performance and reduced the cholesterol profiles. It was obvious that birds on treatment 4 (0.6%) ginger inclusion increased final liveweight and improved the feed conversion ratio (FCR) of turkey poult. It is therefore concluded and recommended that the dietary inclusion of ginger powder meal at 0.6% levels in turkey poult should be adopted by animal nutritionist and farmers.

**Keywords:** ginger, turkey poult, growth performance, serum biochemistry

### Description of Problem

Herbal supplements are primarily included to ameliorate the efficiency of the birds growth, prevent disease and increase feed utilization. Amidst all growth promoters, the most frequently used are antibiotics. Recently the use of synthetic antibiotics is gradually going toward extinction (1). Medicinal plants and their principal secondary metabolites are used mostly in food products, pharmaceutical industry due to their different medicinal properties (2).

Ginger (*Zingiber officinale*) has antimicrobial activity against gram positive and gram negative bacteria and anti-inflammatory properties (3). The use of ginger and ginger powder significantly increased body weight and improved feed conversion compared to birds fed with control diet. Ginger

as substitute for antibiotics growth promoters is desirable for better productivity of poultry, improved palatability of feed, nutrient utilization, stimulation of appetite and increase the flow of gastric juice (4). The valuable sources of medicines are currently in increasing demand and popularity on which about 80% of people in developing countries still rely for their primary health care (5). People are now aware of the limitations of synthetic drugs and chemicals in terms of higher cost, anticipated toxicity and adverse effects (6). On the other hand, the natural medicines are more suitable for animal health care with the benefits of total safety. In this era of food safety concern, emerging antibiotic resistance and residual effects in food products can play wonderful role for safeguarding health of humans and animals (7). The aim of

this study was to determine the effects of ginger as growth promoter on growth performance and serum biochemistry of turkey poult.

**Materials and Methods**

**Location of study**

The study was conducted at the poultry unit of Teaching and Research farm, Department of Agricultural Technology.

**Animals, Experimental design and Feeding management**

A total of Ninety-six (96) two-weeks old American bronze unsexed turkey poult were randomly distributed to four dietary treatments. Twenty four turkey poult per treatment replicated thrice with eight poult per replicate in a completely randomized

design (CRD). The animals were fed *ad-libitum* throughout the period of the experiment (42days). The test ingredients ginger powder used for this study was purchased at the local market. Ginger was washed, sliced, sundried and grinded into fine particles. It was used to formulate the diet at different inclusion levels of 0%, 0.2%, 0.4% and 0.6%. A basal diets (turkey starter) was formulated for the period of the experiment (14-56day) to meet the (8) requirements for turkey poult. Thereafter, the basal diet was divided into four diets. Diet 1 contained 0% of ginger supplementation, diet 2 was supplemented with 0.2% of ginger, diet 3 was supplemented with ginger, 0.4% while diet 4 was supplemented with 0.6% Of ginger. The composition of experimental diets is presented in table 1.

**Table 1. Composition of basal diet for turkey poult (g/100g)**

<b>Ingredients</b>	<b>Compositions (%)</b>
Maize	37.0
Soybean meal	28.0
Groundnut cake	24.0
Fish meal	2.00
Bonemeal	5.00
Oyster shell	3.00
Nacl	0.30
Methionine	0.30
Lysine	0.20
Premix	0.20
Calculated nutrients (%)	
Crude protein	27.98
Crude fibre	3.78
Calcium	3.09
Phosphorus	1.03

Vit A-10,000,00iu., D<sub>3</sub> 2,000iu., B<sub>1</sub> 0.75g., B<sub>2</sub> 5g., Nicotinic aci 25g., Calcium pantothanate 12.5g., B<sub>1</sub> 0.015g., K<sub>3</sub> 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., DI-methionine-50g, Selenium 0.6g., Lysine 120g., BA

**Data collection**

Feed intake was recorded and the turkey poult were weighed weekly over the 8 weeks

of the feeding trial. The feed conversion ratio (FCR) was calculated as the ratio of feed intake to body weight gain. At the end of the

feeding trial, blood samples were taken from the jugular vein into tubes then allowed to clot and sera separated by centrifugation at 300rpm for 5minutes. Cholesterol, triglyceride, high density lipoprotein (HDL), low density lipoprotein (LDL), alanine transaminase (ALT), aspartate transaminase (AST) were determined by enzymatic calorimetric methods

using kits and semiautomatic chemistry analyzer.

### Statistical analysis

Data were analysed using SPSS software. The significance of the differences among the means was determined.

**Table 2: Growth Performances of turkey poult fed ginger powder supplemented diets**

Parameters	Treatment groups (%)				SE	p value
	0	0.2	0.4	0.6		
Initial weight (g)	607.23	606.84	606.88	607.01	0.41	0.99
Final liveweight(g)	3518.41 <sup>c</sup>	3553.80 <sup>bc</sup>	3610.52 <sup>b</sup>	3680.11 <sup>a</sup>	18.88	0.01
Bodyweight (g)	683.80 <sup>c</sup>	687.14 <sup>c</sup>	692.22 <sup>b</sup>	697.90 <sup>a</sup>	1.67	0.01
Feed intake (g/bird)	1320.68	1335.45	1282.96	1278.25	10.70	0.15
Feed conversion ratio	1.98 <sup>a</sup>	1.94 <sup>ab</sup>	1.85 <sup>ab</sup>	1.81 <sup>b</sup>	0.03	0.09

<sup>abc</sup> Mean within rows having same superscripts do not differ at (P<0.05)

**Table 3: Serum biochemistry of turkey poult fed turmeric powder supplemented diets**

Parameters	Treatment groups (%)				SE	p value
	0	0.2	0.4	0.6		
Cholesterol mg/dl	249.80 <sup>a</sup>	244.47 <sup>b</sup>	243.15 <sup>bc</sup>	242.11 <sup>c</sup>	0.97	0.01
Triglyceride mg/dl	120.82 <sup>a</sup>	119.96 <sup>ab</sup>	119.86 <sup>ab</sup>	119.25 <sup>b</sup>	0.23	0.09
High density lipoprotein	50.40 <sup>c</sup>	52.22 <sup>b</sup>	52.98 <sup>ab</sup>	53.66 <sup>a</sup>	0.40	0.01
Low density lipoprotein	48.96 <sup>a</sup>	47.94 <sup>a</sup>	47.27 <sup>ab</sup>	45.92 <sup>b</sup>	0.41	0.03
ALT (IU/L)	873.36 <sup>a</sup>	869.89 <sup>b</sup>	868.10 <sup>bc</sup>	865.61 <sup>c</sup>	0.93	0.00
AST (IU/L)	1000.19 <sup>a</sup>	995.17 <sup>ab</sup>	987.92 <sup>bc</sup>	979.82 <sup>c</sup>	2.57	0.01

ALT- Alanine transaminase; AST- Aspartate transaminase ; <sup>abc</sup> Mean within rows having same superscripts do not differ at (P<0.05)

### Results

Data presented in table 2 showed that final liveweight and body weight gain of turkey poult on treatment 4 were significantly (P<0.05) higher than those of poult on other treatment groups. The feed intake of poult were not influenced by the treatments.

The feed conversion ratio (FCR) of poult on treatment 4 was significantly (P<0.05) lower than poult on other treatment groups. There was a significant (P<0.05) decrease in cholesterol values of turkey poult on treatment 4 compared to other treatments. The values of triglyceride, LDL were similar while

the values of ALT recorded for turkey poult on control diet was significantly (P<0.05) higher than the values recorded for birds on other treatments groups. The values of AST recorded for poult on control diet and treatment 2 were similar but significantly (P<0.05) higher than values recorded for poult on treatments 3 and 4. However, HDL of turkey poult on treatment 4 was significantly (P<0.05) higher than the birds on control diet and other treatment groups.

### Discussion

The results of this study agree with (9)

who reported an increase in body weight gain and a decrease in feed conversion ratio which led to an improvement in final liveweight of birds. (10) observed significantly ( $P < 0.05$ ) high body weight in broiler supplemented with ginger powder when compared to birds on control diet which might be due to ability of ginger powder to increase digestive fluids and thereby improves absorption and neutralizes toxins and stomach acid. In contrast to our findings, (11) indicated that herbs, plant extracts did not affect body weight gain or feed conversion ratio in broiler chicken. The result of FCR in this study agrees with the observation of (12) that supplementation of ginger in poultry diet had positive effect on feed conversion ratio whereas (13) observed that supplementation of ginger in poultry diet did not exert any influence on FCR when compared to control.

In this study, there was a significant reduction in cholesterol values of birds on treatment groups. This result agrees with the report of (14) that total cholesterol decreased significantly in broilers fed with 0.4 and 0.6% aqueous ginger extract. (15) reported that 5g/kg ginger powder reduced the level of serum cholesterol in broiler. Increased activities of the active compounds (gingerol, shogaols, gingerol and gingerdione present in ginger decrease the values triglyceride, LDL, AST and AST values (16). The hypotriglyceridemic effects in poultry birds fed herbs were probably due to active ingredients in herbs leading to a decrease in the activity of lipogenic enzymes, thereby reducing re-synthesis of fatty acids in liver and subsequently reducing LDL cholesterol level (17). Turkey poults on diets supplemented with ginger had better HDL values compared to those on control diet. This indicated that the tendency of having high serum lipid can be prevented by supplementating poultry diets with natural additives. (15) observed that the cholesterol profile including total

cholesterol, triglyceride and LDL decreased significantly in the treated group while HDL cholesterol concentration increased. This study agrees with the observation of (18) that the effect of dosing broilers with 10ml/L of drinking water with an aqueous extract of a mixture of medicinal plants (ginger and garlic) resulted in a significant decrease in ALT and AST. (19) reported a significant reduction in serum of diets supplemented with herbs on ALT and AST of turkey in different groups. Generally, ALT and AST are considered as liver enzyme which increased with liver damage (hepatocellular degeneration), so the decrease in ALT and AST may provide evidence for the occurrence of hepatoprotective effect of active compounds of ginger. The alteration in the serum metabolites may be due to compounds like (E)-8 beta, 17-epoxylabeled-12-ene-15 isolated from ginger has been described to inhibit cholesterol biosynthesis in homogenated rat liver (20)

### **Conclusion and Application**

1. Supplementing of ginger powder meal in turkey poults with 0.6% inclusion level in this study had positive effects on growth performance and serum metabolites levels.
2. It is therefore concluded and recommended that the dietary inclusion of ginger powder meal at 0.6% levels in turkey poults should be adopted by animal nutritionist and farmers.
3. Further research is necessary to investigate the efficacy of ginger powder meal in lipid profile by increasing the level of inclusion in turkey diets.

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