FEED ADDITIVE EFFECTS OF GRADED LEVELS OF GINGER (*Zingiber Officinale*) ON BLOOD SERUM AND LIPID PROFILE OF BROILERS

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Abstract
This study evaluated the effect of incorporating ginger meals in broiler chicken fed Blood Serum biochemical and lipid profile of the animals. A total of 120 Anak broiler chickens, were used in a complete randomized design which lasted for eight weeks. Diet 1 (Control) contained no ginger, diets, 2, 3, 4 and 5 contained 0.5%, 1.0%, 1.5% and 2.0% ginger respectively. Blood sample collected and analyzed for its Blood serum and lipids components attributesResults on the serum biochemical and lipid profile obtained from the experimental birds showed significant (P<0.05) dietary treatments effect on serum-biochemical and lipid profile. Notably, the birds consuming 1.5% ginger had the highest values for Globulin (1.67, 1.85, 1.50, 2.15and1.83g/dl) and Triglyceride (19.50, 30.17, 25.50,39.67 and 26.50 mg/dl). It can be concluded that the inclusion of ginger (Zingiber officinale) to the broiler diet enhances the health statue. The chickens can tolerate ginger root powder up to 1.5%.

Key words: Ginger, Broilers, Serum biochemical indices and lipid profile

Introduction

Feed additive are added in animal feed to improve their nutritive value, boost animal performance by increasing their growth rate, better feed conversion efficiency, greater livability and lowered mortality in poultry birds (Zomrawi *et al.*, 2013). Ginger (*Zingiber officinle*) has been widely used as a condiment and as a herbal medicine to treat a wide range of disorders (Ali *et al.*, 2008). Recently Ahn *et al.* (2002) showed that, use of plants extracts as natural antioxidants has gained increasing interest because of the global trend of restriction in the use of synthetic substances (Zhang *et al.*, (2009). These preparations have been shown to activate digestion, strengthen the immune system and have antibacterial properties. Medicinal plants are used as primary health care aid among eighty percent of the world's population in the form of plant extracts or their active component (WHO, 2008). The objective of the study is to evaluate the response of ginger, (*Zingber officinale*) diets on the physiology of birds in the humid zone of southern Nigeria.

Materials and Methods

Experimental Birds and Experimental Diets

A total of 120 Anak broilers were used for the experiment. Twenty four (24) birds were randomly selected based on their average initial weights to each of the five treatment diets. Each treatment group contains three replicates with eight (8) birds per replicate and they were assigned to the five treatment diets in a complete randomized design (CRD).Diets T1 were formulated to contain 0% (control diet), diets T2 contain 0.5% ginger, diet T_3contain1.0% ginger,T4 1.5% ginger and T_5 contain 2.0% ginger respectively.

Blood sample collection

Blood sample was collected at the end of the experiment. The birds were fasted over night and blood was collected from the Jugular veins. Specimen for anticoagulant free tubes was used for collecting blood samples for biochemical analyses. The blood samples were analysed using routinely available clinical methods. Serum protein, albumen, globulin and urea were analysed using sigma assay kits, while glucose and creatinine were determined according to Slot (1965), uric acid according to Henry *et al.* (1957) and cholesterol according to Roschlan *et al.* (1974).

Experimental design and statistical analyses

All data obtained were subjected to analysis of variance to investigate the effect of treatment on serum biochemistry and lipid profile, using the General Linear Model of SAS (1999). Duncan's Multiple Range Test was used to separate the means that are significantly difference (Gomez and Gomez, 1984).

Results and Discussion

The serum total proteins concentration of 3.48-4.08g/dl record in this study is within the normal standard values. In this study we observed higher values of serum glucose, total protein and cholesterol for birds fed 1.5% ginger root powder which did not agree with the findings of Al-

Homidan (2005) and Ademola *et al.* (2009) who found a significant decrease in blood serum glucose, total protein and cholesterol when feeding chicks up to 6% ginger, similar observation reported by Wafaa *et al.* (2012) who pointed that feeding chicks ginger root powder at levels 0.5% and 1% decreased serum cholesterol levels. Effects of supplementation can be used to lower risk factor of the cardiovascular diseases and cancer either in animals or human (Ademola *et al.*, 2009).There were no significant reductions in the total cholesterol which is as a result of the significant increase in the LDL cholesterol concentration. This result did not agree with the studies conducted by Herawati (2010) who reported a reduction in the fat content of broilers fed ginger. This present findings did not suggest that the ginger supplementation in feed is effective in regulation of lipid metabolism in broilers. These findings are similar to those of Onu (2010) who reported that supplementation of ginger (0.25%) in the basal diet of broiler chicks did not result in any significant difference in terms of total protein, globulin, urea and creatine. The result was contrary to the results of Saeid *et al.* (2010) who found that serum glucose, total cholesterol, LDL-cholesterol and VLDL cholesterol decreased significantly in broilers fed with 0.4 and 0.6% aqueous ginger extract but, HDL-cholesterol concentration increased in these birds according to their findings Zhang *et al.*(2009). The supplementation of ginger increased cholesterol levels in blood serum because of its ant oxidative action which also a mechanism that could be used as anti-stress approach (Jang *et al.*, 2007).

Conclusion

According to the results of current experiment, it was found that the inclusion of ginger (Zingiber oficinale), to the broiler diets enhance the blood lipid profile and serum biochemical and could also improve the health statue of the birds.

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Table 1: Chemical composition of experimental broiler finisher diets (%)

Ingredients (%)	T1(Control)	T2(Ginger)	T3(Ginger)	T4(Ginger)	T5(Ginger)
Crude protein	18.00	18.00	18.00	18.00	18.00
Fats/oil	6.00	6.00	6.00	6.00	6.00
Crude fiber	6.00	6.00	6.00	6.00	6.00
Calcium	1.00	1.00	1.00	1.00	1.00
Phosphorus	0.45	0.45	0.45	0.45	0.45
Salts	0.30	0.30	0.30	0.30	0.30
Metabolizable energy (Kcal/kg)	2900	2900	2900	2900	2900
Ginger	0.00	0.5	1.0	1.5	2.0

Table 2: Serum biochemical parameters of experimental birds

Parameters	T1Control	T2(0.5%) ginger	T3(1.0%)ginger	T4(1.5%) ginger	T5(2.0%)ginger
Total proteins (g/dl)	3.48 ± 0.14^{c}	3.55 ± 0.08^{bc}	3.80 ± 0.07^{b}	4.08 ± 0.06^{a}	3.50 ± 0.09^{c}
Albumin(g/dl)	1.82 ± 0.11^{b}	1.70 ± 0.11^{b}	2.47 ± 0.07^{a}	1.90 ± 0.04^{b}	1.66 ± 0.11^{b}
Globulin(g/dl)	1.67 ± 0.07^{b}	1.85 ± 0.13^{ab}	1.50 ± 0.14^{b}	2.15 ± 0.08^{a}	1.83 ± 0.14^{ab}
Urea(g/dl)	4.03 ± 0.02^{c}	4.5 ± 0.22^{bc}	4.5 ± 0.22^{bc}	5.17 ± 0.31^{b}	6.00 ± 0.37^{a}
Uric Acid(g/dl)	2.35 ± 0.08^{c}	3.58 ± 0.21^{a}	2.62 ± 0.03^{bc}	2.47 ± 0.02^{bc}	2.72 ± 0.07^{b}
Creatinine(mg/dl	0.50 ± 0.04^{ab}	0.58 ± 0.05^{a}	0.48 ± 0.05^{ab}	0.45 ± 0.03^{b}	0.55 ± 0.03^{ab}
Calcium(mg/dl)	8.55±0.08	8.97±0.02	8.63±0.19	6.64±1.81	8.22 ± 0.16^{NS}
Phosphorus(g/dl)	7.5 ± 0.19^{bc}	8.08 ± 0.34^{ab}	8.63 ± 0.06^{a}	8.08 ± 0.21^{ab}	7.18 ± 0.16^{c}

Means in the same Rows with different superscript differs ($p<0.05$) significantly

Table 3: Lipid Profile parameters of experimental birds

Parameters	T1Control	T2(0.5%) ginger	T3(1.0%)ginger	T4(1.5%) ginger	T5(2.0%)ginger
Glucose (mg/dl)	162.5±2.99	176.33±12.08	182.83±8.73	177.83±3.38	160.33±5.82
Total Cholesterol (mg/dl)	112.00 ± 0.86^{b}	$128.33\pm a0.61^{a}$	116.83 ± 2.49^{b}	125.00 ± 1.97^{a}	118.00 ± 3.89^{b}
Triglyceride (mg/dl)	19.50 ± 0.99^{c}	30.17 ± 0.70^{b}	25.50 ± 1.89^{b}	39.67 ± 0.49^{a}	26.50 ± 2.62^{b}
High density lipoproteins(g/dl)	92.00 ± 1.16^{bc}	95.00 ± 1.24^{ab}	99.50 ± 0.67^{a}	87.83±1.78c	97.50 ± 3.07^{a}
Low density lipoproteins(g/dl)	16.00 ± 0.86^{b}	15.50 ± 1.06^{b}	16.50 ± 2.11^{b}	18.00 ± 0.77^{ab}	21.00 ± 1.09^{a}

Means in the same Rows with different superscript differs ($p<0.05$) significantly