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Effect of Ginger on Haematological Parameters in Broiler Chickens

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Abstract: - **The effect of feeding increasing levels of ginger powder on the haematological parameters of broilers was investigated. A total of 340 broilers were fed 1 of 4 corn-soybean basal diets that contained 0, 5, 10, or 15 g/kg of ginger powder until slaughter. At slaughter, samples of blood were collected from five chickens per treatment. Haematological analysis of the blood was conducted using Cell-Dyn 3500 Hematology System. Growth rate, feed efficiency, feed consumption, and mortality were measured and monitored. All broilers appeared healthy and no significant mortality occurred. The overall growth of birds was not adversely affected by the addition of ginger. Body weight gain of birds supplemented with ginger was significantly different than that of control birds during weeks 1 and 3. At week1, body weight gain was significant higher when ginger was supplemented at 5 and 10 g/kg than the control, which was similar when ginger was supplemented at 15 g/kg (P = 0.027). At week 3, body weight gain was significantly higher in the ginger-supplemented groups at all levels than the control group (P< 0.001). No significant difference was observed between the dietary groups at week 5. There was no significant difference across the treatment means in terms of feed consumption at weeks 1 and 5. Feed consumption was significantly higher for all the ginger-supplemented groups than the control group at week 3. The inclusion of ginger in broiler diets did not affect the haematological parameters of the chickens. However, there was a significant increase in the total white blood cells (WBC) as the ginger level increased in the diet. The WBC percentage was 47.9 for the control group and 79.6, 75.3, and 74.2 when ginger was added at 5, 10 and 15 g/kg, respectively (p< 0.001). Neutrophils percentage was 13.1, 24.6, 29.3, and 32.6 for broilers fed with ginger at 0, 5, 10, and 15 g/kg, respectively. Mortality was not affected by ginger inclusion. In conclusion, ginger inclusion did not adversely affect the palatability of the diet and did not cause anaemia for the broilers. It may enhance the growth rate of the broiler chickens.**

Keywords: **Broilers, ginger, haematological parameters.**

I. INTRODUCTION

Materials and Methods

Birds and Diets

The broiler chicks were fed, ad libitum, corn/soy-based diet that meets the National Research Council (NRC) requirements. The chicks received a starter diet from hatch until 7 days of age, a grower diet from 8 days to 21 days of age, and a finisher diet from 22 days to 35 days of age. All diets were prepared as needed. The control birds received no ginger. The temperature for the broilers was kept at 30°C for 14 day and then gradually reduced to 21°C by 21 day.

Sample Collection Blood samples were collected from five chickens from each battery, 8-10 mls of blood were collected in each tube. The samples were kept in an ice box and instantly were analyzed by the Cell-Dyn 3500 Hematology system (Abbott Laboratories, Abbott Park, IL, USA) to measure the total and differential WBC and blood quality parameters including RBC, haemoglobin (HGB), haematocrit (HCT), mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC), red cell distribution width (RDW), and platelet count (PLT). Proximate analysis of the ginger was done for crude protein, ash, dry matter, and crude fiber.

II. RESULTS AND DISCUSSION

The current study was conducted to investigate the effect of feeding increasing levels of ginger powder on the haematological parameters of broilers. Biochemical studies on the blood of ginger-fed broiler chicken were conducted by several authors. For example, Rehman et al. (2011) studied the effect of dosing broilers (10ml/l of drinking water) with an aqueous extract of a mixture of medicinal plants (garlic, mberberine, and aloe vera) along with ginger, which resulted in a significant decrease in serum glucose, alanine aminotransferase, aspartate aminotransferase and alkaline phosphatase concentration; however, serum protein increased significantly in the treated group. In the same experiment, the cholesterol profile including total cholesterol, triglyceride, low density lipoprotein, and very low density lipoprotein decreased significantly in the treated group, while high density lipoprotein cholesterol concentration increased. Also, Zhang et al. (2009) found that the total protein concentration

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was higher at 21 days and 42 days of sampling in broilers supplemented with ginger powder, but cholesterol concentration was reduced at these intervals. Kausar et al. (1999) reported that carminative mixture containing ginger at the dose rate of 2 and 4 ml/l of drinking water did not affect serum albumin, globulin, and total protein in broilers. Al-Homidan (2005) observed reduced total protein and globulin in the plasma of broiler chicks due to the dietary supplementation of 60 g/kg, which may be due to the toxic effect of ginger. However, Ademola et al. (2006) reported that the supplementation of ginger at the rate of 5, 10, and 15 g/kg did not affect the total protein and albumin in the serum of broilers. The inclusion of ginger in broiler diets in the current study did not affect the haematological parameters of the chickens except for the total WBC and percentage of neutrophils. There was a significant increase in the total WBC as the ginger level increased in the diet.

III. CONCLUSION

The fact that both the control and the treatment diets were equally consumed indicates that ginger inclusion did not adversely affect the palatability of the diet. It is noteworthy that ginger inclusion did not cause anaemia for the broilers as there was no significant effect on the RBC counts and haemoglobin concentration.

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Table 1.Haematological and biochemical parameters of broilers fed ginger powder

	Treatment (g/kg)					
Parameter	0	5	10	15	SEM	Significance
WBC (K/μL)	47.9[b]	79.6[a]	75.3[a]	74.2[a]	4.42	***
Neutrophils (%)	13.1[c]	24.6[b]	29.3[a]	32.6[a]	1.26	***
Lymphocytes (%)	72.3	73.9	68.2	65.4	4.06	0.474
Monocytes (%)	9.2	7.6	11.03	5.84	1.82	0.256
Eosinophils (%)	0.03	0.02	0.04	0.01	0.01	0.318
Basophils (%)	2.9	2.4	4.15	2.5	0.76	0.384
RBC (M/μL)	2.9	2.2	2.41	2.00	0.27	0.469
HGB (g/dL)	13.2	13.3	12.26	12.7	0.51	0.266
HCT %	34.7	34.7	31.28	34.6	1.09	0.104
MCV (fL)	127.8	130.4	129.8	128.0	1.87	0.702
MCH (pg)	49.9	51.7	50.9	50.2	0.64	0.238
MCHC (g/dL)	39.0	39.6	39.3	39.2	0.64	0.918
RDW %	12.1	12.3	12.1	12.4	0.45	0.975
PLT (K/μL)	1.79	3.7	2.1	0.8	1.05	0.306

Means within rows are significantly different at $p \leq 0.05$, n=5, ***P <0.001

SEM= Standard error of the mean, calculated by one-way analysis of variance (ANOVA) and the general linear model procedure of Minitab.

WBC= white blood cells, RBC= red blood cells, HGB= haemoglobin, HCT=haematocrit

MCV= mean corpuscular volume, MCH=mean corpuscular haemoglobin,

MCHC=mean corpuscular haemoglobin concentration, RDW= red cell distribution width, PLT= platelet count