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## Effects of Green Tea (*Camellia sinensis*) Powder Supplementation on Growth Performance of Broiler Chicken

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### ABSTRACT

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This study evaluated the impact of dietary green tea (*Camellia sinensis*) powder supplementation on growth performance and hematological parameters in broiler chickens. A total of 150 Cobb-500 chicks were randomly assigned to three dietary treatments: a control group ( $T_0$ ; basal diet), an antibiotic-supplemented group ( $T_1$ ; basal diet + amoxicillin 30% at 1 g/kg feed), and a green tea-supplemented group ( $T_2$ ; basal diet + 0.5% green tea powder). All birds were reared for 35 days under uniform management conditions. Performance indicators including body weight gain, feed intake, feed conversion ratio (FCR), dressing percentage, offal weight, intestinal length and hematological variables (TEC, Hb, PCV, SGOT, and SGPT) were recorded. Broilers receiving green tea exhibited significantly higher ( $P < 0.001$ ) final body weight ( $2004.88 \pm 6.96$  g) and the lowest FCR (1.49), outperforming both the antibiotic (1.54) and control groups (1.61). Hematological profiles also improved markedly ( $P < 0.001$ ) in the green tea group. Green tea supplementation increased dressing and offal weight percentages without negative effects on bird health. Overall, the findings suggest that inclusion of 0.5% green tea powder in broiler diets enhances growth and physiological status and may serve as a promising natural alternative to antibiotic growth promoters (AGPs).

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## Introduction

Global poultry production continues to expand rapidly, driven by increasing demand for affordable animal protein. Broiler chickens are particularly important due to their fast growth, efficient feed utilization, and consumer preference for lean meat (Ariana et al., 2011). However, intensive production exposes birds to various stressors that can compromise health and productivity (Toghyani et al., 2010). Traditionally, antibiotics have been used as growth promoters to enhance feed efficiency and disease resistance, but their use has been restricted due to the risk of antimicrobial resistance and consumer health concerns (Ariana et al., 2011). Phytogenic feed additives, including herbs and plant extracts, have gained attention as natural alternatives to antibiotics. Green tea (*Camellia sinensis*) is rich in catechins, particularly epigallocatechin gallate (EGCG), known for its antimicrobial, antioxidant, and immunomodulatory properties (Abdul-Azeem, 2005; Guo et al., 2004). Previous studies have suggested that green tea may improve growth performance and carcass quality in broilers, though findings remain inconsistent (Sarker et al., 2010). This study aimed to evaluate the effects of green tea powder supplementation on growth performance, feed efficiency, carcass traits, and hematological profiles of broiler chickens, with the goal of determining its potential as a natural antibiotic substitute (Ariana et al., 2011).

## Materials and Methods

### Experimental Design and Management

The experiment was conducted at Aziz Poultry Farm, Magura Sadar, under the supervision of the Department of Pharmacology and Toxicology, Sylhet Agricultural University, Bangladesh. One hundred fifty-day-old Cobb-500 chicks were randomly allocated to three groups (n = 50 per group):

T<sub>0</sub>: Control (basal diet only)

T<sub>1</sub>: Antibiotic (basal diet + amoxicillin 30%, 1 g/kg feed)

T<sub>2</sub>: Green tea (basal diet + 0.5% green tea powder, 5 g/kg feed)

Birds were reared for 35 days under identical management conditions with ad libitum feed and water. Standard commercial pre-starter, starter, and grower feeds (Nourish Feed Ltd.) were used.

### Data Collection

Live body weight was recorded weekly. Feed intake and feed conversion ratio (FCR) were calculated at 7-day intervals. At day 35, five birds per group were randomly selected for slaughter to measure dressing percentage.

### Hematological and Biochemical Analysis

Blood samples were collected from wing veins at day 35. Parameters analyzed included Total Erythrocyte Count (TEC), Hemoglobin (Hb), Packed Cell Volume (PCV), Serum Glutamate Oxaloacetate Transaminase (SGOT), and Serum Glutamate Pyruvate Transaminase (SGPT), using standard methods Lamberg and Rothstein (1977); Coffin (1995); Gupta and Charan (2007).

### Statistical Analysis

Data were analyzed using one-way ANOVA (Minitab v20), and mean differences were determined using Tukey's test. Significance was set at  $P < 0.001$ .

## Results and Discussion

### Growth Performance

Broilers supplemented with green tea ( $T_2$ ) exhibited significantly higher ( $P < 0.001$ ) body weight gain (2004.88 g) compared to antibiotic (1964.86 g) and control groups (1914.75 g).

**Table 1.** Comparison of live body weight among the group

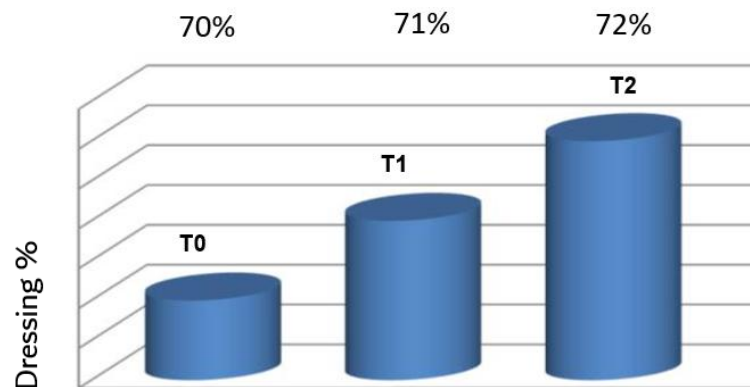
Group	Mean Live Weight gain (g)				
	Day 7	Day 14	Day 21	Day 28	Day 35
$T_0$ (N=50)	167.55b	463.27c	899.46c	1462.18c	1914.75c
$T_1$ (N=50)	179.27a	475.78b	921.44b	1487.49b	1964.86b
$T_2$ (N=50)	182.07a	485.05a	940.63a	1518.56a	2004.88a
SEM	1.34	1.77	3.25	4.44	6.69
Level of Significance	***	***	***	***	***

$T_0$  = Control group,  $T_1$  = Antibiotic supplemented group,  $T_2$  = Green Tea supplemented group, N= Number of birds, SEM= Standard Error of Mean

\*\*\*Values in rows with different superscripts differ significantly ( $p < 0.001$ )

### Carcass Traits

The highest dressing weight (1443.51 g) and dressing percentage (72%) were recorded in the green tea group. Offal weights (heart, liver, spleen) were also significantly higher ( $P < 0.001$ ) in  $T_2$ , while gizzard weight was slightly lower. The intestinal length was longest in  $T_2$  (160.48 cm) compared with  $T_0$  (145.30 cm).



**Figure 1.** Carcass traits in percentage

### Feed Intake

All the feed intake values are presented in Table 2. Feed was supplied in different groups  $T_0$ ,  $T_1$  and  $T_2$  separately. Every 7 days interval total consumed feed amount of each group are calculated from total feed stock. Feed intake was slightly lower in the green tea group (2987 g) compared to the control (3086 g).

**Table 2.** Comparison of feed intake among the group

Group	Average feed intake (g/bird)				
	Day 7	Day 14	Day 21	Day 28	Day 35
T <sub>0</sub> (N=50)	150	535	1180	2150	3086
T <sub>1</sub> (N=50)	156	540	1165	2125	3026
T <sub>2</sub> (N=50)	160	555	1152	2100	2987

**Feed Conversion Ratio (FCR)**

All the FCR values are presented in Table 3. FCR improved significantly in the green tea group (1.49) compared with antibiotic (1.54) and control (1.61). Use of dietary green tea improves feed conversion ratio.

**Table 3.** Effects of treatments on FCR 7 days interval

Group	Feed Conversion Ratio (FCR)				
	Day 7	Day 14	Day 21	Day 28	Day 35
T <sub>0</sub> (N=50)	0.90	1.15	1.31	1.47	1.61
T <sub>1</sub> (N=50)	0.87	1.13	1.26	1.43	1.54
T <sub>2</sub> (N=50)	0.80	1.14	1.22	1.38	1.49

**Hematological and Biochemical Parameters**

All the hematological values are presented in Table 4. The green tea-supplemented group showed significant increases ( $P < 0.001$ ) in Hb (13.75 g/dl), PCV (41.70%), and TEC ( $4.85 \times 10^6/\text{mm}^3$ ) compared to the control. SGOT and SGPT levels were also elevated within physiological ranges, suggesting enhanced liver function. The mean values of hemoglobin increased significantly ( $p < 0.001$ ) in all the treated groups and the highest was recorded in group T<sub>2</sub> (13.752g/dl) and lowest in control group T<sub>0</sub> (9.806g/dl). The mean value of PCV (Packed Cell Volume) also increased significantly ( $p < 0.001$ ) in all the treated groups. The highest value was recorded in group T<sub>2</sub> (41.707%) and lowest in control group T<sub>0</sub> (36.463%). The mean values of TEC (Total Erythrocyte Count) in all treated groups were increased significantly ( $p < 0.001$ ) than control group. The highest TEC value was recorded in group T<sub>2</sub> (4.850 million/ $\text{mm}^3$ ) and lowest in group T<sub>0</sub> (3.113 million/ $\text{mm}^3$ ).

**Table 4.** Haemato-biochemical parameters in broilers after being treatments

Items	Treatment (Mean)			SEM	Level of Significance
	T <sub>0</sub> (N=50)	T <sub>1</sub> (N=50)	T <sub>2</sub> (N=50)		
Hemoglobin Content (g/dl)	09.806 <sup>C</sup>	11.820 <sup>b</sup>	13.752 <sup>a</sup>	0.315	***
PCV (%)	36.463 <sup>C</sup>	38.866 <sup>b</sup>	41.707 <sup>a</sup>	0.437	***
TEC (million/ <sup>3</sup> mm blood)	03.113 <sup>b</sup>	03.687 <sup>b</sup>	04.850 <sup>a</sup>	0.172	***
SGOT (U/L)	342.80 <sup>a</sup>	332.56 <sup>b</sup>	287.96 <sup>C</sup>	4.440	***
SGPT (U/L)	06.757 <sup>a</sup>	05.743 <sup>b</sup>	04.77 <sup>c</sup>	0.186	***

T= Control group, T= Antibiotic supplemented group, T= Green Tea supplemented group, N= Number of birds, SEM= Standard Error of Mean

\*\*\*Values in rows with different superscripts differ significantly ( $p < 0.001$ )

The inclusion of 0.5% green tea powder improved body weight gain and feed efficiency in broilers, consistent with findings by Sarker et al., (2010) and Biswas et al., (2000). Green tea catechins may enhance digestive enzyme activity, modulate gut microflora, and reduce oxidative stress, leading to improved nutrient utilization (Abdul-Azeem, 2005; Guo et al., 2004). There was a tendency of Green Tea Powder (GTP) to suppressed feed intake (Biswas et al., 2001) without change of the body weight gain. Sarker et al. (2010) showed feed intake highly decreased by increasing the percentage of green tea powder on diet. Feed intake is more decreased in 1.0% green tea powder than 0.5%. Same observation showed by (Yang et al., 2003) that feed intake decreased more in 1.0% green tea powder than 0.5% green tea powder supplied with normal diet and feed intake more decreased in 0.5% green tea powder supplement diet than control. Reduced feed intake with improved FCR indicates better metabolic efficiency. This has been also observed in other feeding experiments using layers (Biswas et al., 2000; Toghyani et al., 2010). Several experiment (Biswas et al., 2001; Sarker et al., 2010; Yang et al., 2003) showed that increased percentage (0.5%) of green tea powder improved feed efficiency or Feed Conversion Ratio (FCR) than control. Similar result observed in current experiment that dietary 0.5% GTP improved FCR in broiler. The positive effects on hematological indices suggest that green tea promotes hematopoiesis and overall physiological health. Increased Hb, PCV, and TEC values support improved oxygen transport and metabolic activity, aligning with earlier reports (Yang et al., 2003). The increased level of total erythrocyte count, hemoglobin content and packed cell volume might be due to the effects on haemopoietic organs. Enhanced SGOT and SGPT values within normal limits indicate improved liver metabolism without toxicity. Dietary supplementation of green tea also affects offal's weight significantly and increase the intestinal length observed significantly in green tea treatment group (Abdul-Azeem, 2005; Guo et al., 2004). These results confirm that green tea powder can serve as a safe and effective alternative to antibiotic growth promoters, improving productivity and health performance in broilers (Abdul-Azeem, 2005; Guo et al., 2004).

## Conclusion

Dietary supplementation of 0.5% green tea powder significantly improved growth performance, feed efficiency, dressing yield, and hematological parameters in broiler chickens. Green tea may serve as a natural and sustainable alternative to antibiotic growth promoters in poultry production.

## Conflict of interest

The authors declare that there is no conflict of interests.

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## References

1. Ariana M, Abdolhossein S, Mohammad AE and Rahman J 2011. Effects of powder and extract form of green tea and marigold, and  $\alpha$ -tocopheryl acetate on performance, egg quality and egg yolk cholesterol levels of laying hens in late phase of production. *Journal of Medicinal Plants Research*, 5(13): 2710–2716.
2. Abdel-Azeem FA 2005. Green tea flowers (*Camellia sinensis*) as natural anti-oxidants feed additives in growing Japanese quail diets. *Egyptian Poultry Science Journal*, 25(3): 569–588.
3. Biswas MAH, Miyazaki Y, Nomura K and Wakita M, 2000. Influences of long-term feeding of Japanese green tea powder on laying performance and egg quality in hens. *Asian-Australasian Journal of Animal Sciences*, 13: 980–985.
4. Biswas AH and Wakita M 2001. Comparison of two dietary factors, green tea powder feeding and feed restriction, influencing laying performance and egg quality in hens. *Bulletin of the Faculty of Bioresources, Mie University* 25/26, 55–61.
5. Coffin DL 1995. *Manual of Veterinary Clinical Pathology*. Third ed. Coin stock Publishing Associates. Inc. Ithaca New York, 116-157.
6. Guo FC, Williams BA, Kwakkel RP, Li, HS, Li, XP, Luo JY, Li WK and Verstegen MWA 2004. Effects of mushroom and herb polysaccharides as alternatives for an antibiotic, on the cecal microbial ecosystem in broiler chickens. *Poultry Science*, 83: 175–182.
7. Gupta G and Charan S 2007. Exploring the potential of *O. sanctum* (Shyama Tulsi) as a feed supplement for its growth promoter activity in broiler chicken, *Indian Journal of Poultry Science*, 42(2): 140-143.
8. Lamberg SL and Rothstein L 1977. "Hematology and Urinalysis" AVI publishing company, Inc. Westport, Connecticut, USA.
9. Sarker MSK, Kim GM and Yang CJ 2010. Effect of green tea and biotite on performance, meat quality and organ development in Ross broiler. *Egyptian Poultry Science Journal*, 30(1): 77–88.
10. Toghyani M, Toghyani M, Gheisari A, Chalamkari G and Mohammadrezaei M, 2010. Growth performance, serum biochemistry and blood hematology of broiler chicks fed different levels of black seed (*Nigella sativa*) and peppermint (*Menthapiperita*). *Livestock Science*, 129: 173–178.
11. Yang CJ, Yang IY, Oh DH, Bae IH, Cho SG, Kong IG, Uuganbayar D, Nou IS and Choi KS 2003. Effect of green tea by-product on performance and body composition in broiler chicks, *Asian-Australasian Journal of Animal Sciences*, 16: 867–872.