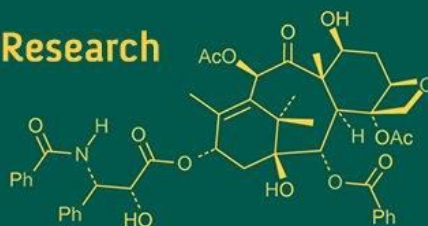


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Effect of botanical feed additives (Turmeric, Amla and Giloy) on serum biochemical parameters of commercial broilers

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Abstract

This study evaluated the effect of dietary supplementation of turmeric (*Curcuma longa*), amla (*Embilica officinalis*) and giloy (*Tinospora cordifolia*) on serum biochemical parameters of commercial broilers. A total of 320 broiler chickens were randomly allotted to four dietary treatments: basal diet (T₁, control), basal diet with antibiotic (T₂), basal diet supplemented with turmeric + giloy (T₃) and basal diet supplemented with amla + giloy (T₄). At the end of the experimental period, blood samples were collected for serum biochemical analysis. Birds receiving botanical supplements showed significantly higher ($P < 0.05$) serum total protein and albumin levels, along with significant reductions in uric acid and creatinine. The lipid profile was markedly improved, with reduced total cholesterol, triglycerides, LDL-C and VLDL-C, and increased HDL-C levels in herbal supplemented groups. The findings demonstrate that botanical feed additives can serve as effective natural alternatives to antibiotic growth promoters in broiler production.

Keywords: Broiler, turmeric, amla, giloy, serum biochemistry, herbal feed additives

Introduction

The increasing global concern over antimicrobial resistance and the presence of antibiotic residues in poultry products has compelled the poultry industry to seek safe, natural and sustainable alternatives to antibiotic growth promoters. Phytochemical feed additives derived from herbs and medicinal plants are emerging as promising candidates because of their multifaceted biological properties including antioxidant, hepatoprotective, antimicrobial and immunomodulatory effects.

Turmeric contains curcuminoids that enhance hepatic function, improve nutrient metabolism and modulate lipid synthesis pathways (Attia *et al.*, 2017) [2]. Amla, one of the richest natural sources of vitamin C, is known to regulate lipid metabolism and protect tissues against oxidative damage (Anila and Vijayalakshmi, 2002; Begum *et al.*, 2019) [1, 4]. Giloy exhibits immunostimulatory, nephroprotective and adaptogenic properties, making it an ideal supplement during metabolic stress in broilers (Bhardwaj *et al.*, 2012; Saeed *et al.*, 2020) [5, 8].

Although individual effects of these botanicals have been reported, scientific information regarding their combined influence on serum biochemical profile in broilers remains scarce. Serum biochemical parameters such as total protein, albumin, uric acid, creatinine and lipid fractions are sensitive indicators of metabolic, hepatic and renal health. Therefore, the present study was designed to evaluate the effect of dietary turmeric + giloy and amla + giloy supplementation on serum biochemical attributes of commercial broilers.

Materials and Methods

Experimental design and diets

Three hundred and twenty-day old commercial broiler chicks were randomly distributed into four treatment groups with 16 replicates per treatment and 5 birds per replicate.

- **T₁:** Control (basal diet)

- **T₂:** Basal diet + antibiotic
- **T₃:** Basal diet + turmeric + giloy
- **T₄:** Basal diet + amla + giloy

Birds were reared under standard management conditions with ad libitum access to feed and water.

Blood sampling and biochemical analysis

At the end of the trial, blood samples were collected, serum separated and analysed for total protein, albumin, uric acid,

creatinine, total cholesterol, triglycerides, HDL-C, LDL-C and VLDL-C using standard biochemical kits.

Statistical analysis

Data were analysed using one-way ANOVA and means were separated using Duncan's multiple range test (Duncan, 1955) [6]. Differences were considered significant at $P < 0.05$.

Results

Serum protein profile

Table 1: Effect of botanical feed additives on serum total protein, albumin, uric acid and creatinine of broilers

Treatment	Total Protein (g/dL)	Albumin (g/dL)	Uric acid (mg/dL)	Creatinine (mg/dL)
T ₁ Control	3.63 ^b	1.83 ^c	1.61 ^c	1.35 ^d
T ₂ Antibiotic	3.56 ^b	1.97 ^b	1.50 ^b	1.24 ^c
T ₃ Turmeric + Giloy	4.22 ^a	2.15 ^a	1.15 ^a	1.18 ^b
T ₄ Amla + Giloy	4.13 ^a	2.20 ^a	1.11 ^a	1.14 ^a
SEM	0.056	0.026	0.029	0.012
N	16	16	16	16
P-value	0.001	0.001	0.001	0.001

Dietary supplementation of botanical feed additives significantly influenced serum protein fractions (Table 1). Birds fed turmeric + giloy (T₃) and amla + giloy (T₄) recorded significantly higher ($P < 0.05$) total protein values of 4.22 and 4.13 g/dL, respectively, compared with control (3.63 g/dL) and antibiotic group (3.56 g/dL). Similarly, serum albumin concentration was significantly increased in T₃ (2.15 g/dL) and T₄ (2.20 g/dL) groups (Table 1).

Serum uric acid and creatinine were significantly reduced in supplemented groups, with the lowest uric acid values observed in T₄ (1.11 mg/dL) and T₃ (1.15 mg/dL), and the lowest creatinine concentration in T₄ (1.14 mg/dL), indicating improved protein metabolism and renal efficiency.

Serum lipid profile

Table 2: Effect of botanical feed additives on serum lipid profile of broilers

Treatment	Total Cholesterol (mg/dL)	Triglycerides (mg/dL)	HDL-C (mg/dL)	LDL-C (mg/dL)	VLDL-C (mg/dL)
T ₁ Control	207.06 ^b	84.52 ^b	125.56 ^c	58.88 ^c	33.50 ^b
T ₂ Antibiotic	199.00 ^b	85.02 ^b	129.36 ^b	55.93 ^c	31.00 ^b
T ₃ Turmeric + Giloy	146.13 ^a	66.46 ^a	140.06 ^a	48.93 ^b	24.00 ^a
T ₄ Amla + Giloy	148.94 ^a	69.99 ^a	139.36 ^a	43.93 ^a	26.30 ^a
SEM	3.816	1.312	0.986	0.964	0.655
N	16	16	16	16	16
P-value	0.001	0.001	0.001	0.001	0.001

A significant ($p < 0.05$) improvement in lipid metabolism was observed in birds receiving botanical supplements (Table 2). Total cholesterol decreased drastically from 207.06 mg/dL in control to 146.13 mg/dL in T₃ and 148.94 mg/dL in T₄. Triglyceride levels were also significantly reduced, with the lowest value in turmeric + giloy group (66.46 mg/dL). High-density lipoprotein cholesterol (HDL-C) increased significantly in supplemented birds, reaching 140.06 mg/dL in T₃ and 139.36 mg/dL in T₄, whereas LDL-C and VLDL-C levels were markedly reduced, reflecting enhanced lipid mobilization and reduced cardiovascular stress (Table 2).

Discussion

The improvement in serum total protein and albumin concentrations in T₃ and T₄ groups reflects enhanced hepatic protein synthesis and improved metabolic efficiency. These findings corroborate reports of Begum *et al.* (2019) [4] and Attia *et al.* (2017) [2], who documented increased serum protein fractions following supplementation with turmeric and amla.

The significant reduction in serum uric acid and creatinine in botanical-supplemented birds suggests better renal function and reduced metabolic load, supporting the

nephroprotective properties of *Tinospora cordifolia* reported by Bhardwaj *et al.* (2012) [5] and Saeed *et al.* (2020) [8].

Marked reductions in serum cholesterol, triglycerides, LDL-C and VLDL-C clearly indicate the hypolipidemic action of curcumin and amla polyphenols. These results are in strong agreement with Babu and Srinivasan (1997) [3] and Anila and Vijayalakshmi (2002) [1], who demonstrated the lipid-lowering effects of curcumin and amla through modulation of hepatic lipid synthesis enzymes.

The increase in HDL-C concentration further indicates improved lipid transport and metabolic health. The superior performance of combined botanical treatments suggests a synergistic interaction among turmeric, amla and giloy in regulating metabolic pathways and maintaining biochemical homeostasis.

Conclusion

Dietary supplementation of turmeric + giloy and amla + giloy significantly improved serum biochemical parameters of broilers by enhancing protein fractions and improving lipid metabolism. These botanicals can be recommended as effective natural alternatives to antibiotic growth promoters in commercial broiler chicken production.

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References

1. Anila L, Vijayalakshmi N. Flavonoids from *Emblica officinalis*-effectiveness for dyslipidemia. J Ethnopharmacol. 2002;79:81-87.
2. Attia YA, Al-Harhi MA, Hassan SS. Turmeric as phytogetic growth promoter alternative for antibiotics in broiler chicks. Rev Mex Cienc Pecu. 2017;8:11-21.
3. Babu PS, Srinivasan K. Hypolipidemic action of curcumin, the active principle of turmeric (*Curcuma longa*), in streptozotocin-induced diabetic rats. Mol Cell Biochem. 1997;166:169-175.
4. Begum K, Talukdar JK, Kalita TC, Roy RN, Rahman M. Effect of dietary supplementation of gooseberry/amlam (*Emblica officinalis*) powder on performance of commercial broilers. Int J Livest Res. 2019;9:95-102.
5. Bhardwaj U, Tiwary BK, Prasad A, Ganguly S. Effect of *Tinospora cordifolia* extract on immune response and serum biochemical profile in broilers. Indian J Anim Sci. 2012;82:379-381.
6. Duncan DB. Multiple range and multiple F test. Biometrics. 1955;11:1-42.
7. Reinhold JG. Total protein, albumin and globulin. In: Standard methods of clinical chemistry. New York: Academic Press; 1953. p. S88-S96.
8. Saeed M, Naveed M, Leskovec J, Kakar I, Ullah K, Ahmad F, *et al.* Using Guduchi (*Tinospora cordifolia*) as an eco-friendly feed supplement in poultry nutrition. Poult Sci. 2020;99:801-811.