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Blood protein data of broilers fed with Jamun (*Syzygium cumini*) seeds

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Abstract

A trial was planned in to evaluate the inclusion of Jamun (*Syzygium cumini*) seeds in commercial broilers. By procuring 240 day old chicks from commercial hatchery, divided these chicks in four treatment groups. Each treatment contained five replicates 12 birds. Total experimental period was for 42 days. Management aspects were similar for all birds including housing, feeding and watering. Bird's feed for pre-starter, starter, and finisher phases was formulated using conventional feeds. Treatments from T₁ to T₄ were formulated in all phases by including Jamun (*Syzygium cumini*) seeds at 0, 0.5, 1 and 1.5% in that order. Blood protein values of total protein and globulin levels were significantly ($p \leq 0.05$) different among different treatments and ranged from 2.55 (T₄) to 3.07 (T₂) and 0.95 (T₃) to 1.30 (T₂), respectively. Though the results varied, it was concluded for inclusion of 1.5% Jamun (*Syzygium cumini*) seeds in broilers.

Keywords: Jamun seed, conventional feed, total protein, globulin

Introduction

Feed constitutes the major expenditure in poultry production. Fluctuating market price of conventional feed ingredients diverted scientists towards search of unconventional ingredients. Chick played a vital role in unraveling the nutritional importance of many minerals. But however, Marginal deficiencies of both major and minor mineral elements invariably cause significant reduction in the birds' performance.

Jamun seed has been reported to contain jambosine, gallic acid, ellagic acid, coritagin, 3, 6 – hexahydroxy di phenoyl glucose, 4, 6 – hexahydroxy diphenoyl glucose and quercetin (Modi *et al.*, 2010) [9]. The alcoholic extract of the seed has also shown to possess alkaloids, flavonoids, glycosides, phytosterol, saponins, tanins and triterpenoids (Kumar *et al.*, 2009) [6]. Mastan *et al.* (2008) [7] suggested that the methanolic extract of Jamun seeds possesses promising immunomodulatory activity. The methanolic extract of Jamun seeds also possess broad antibacterial spectrum and anti-fungal activity (Mathur *et al.*, 2011) [8].

Ahmed *et al.* (2015) [1] observed that, Jamun seeds contain moisture, crude protein, crude fat, crude fiber, ash, and nitrogen-free extract (NFE) as 16.34, 1.97, 0.65, 4.19, 2.18 and 74.67, respectively. Whereas, Kochhar *et al.* (2006) [5] observed similar results which contain moisture, crude protein, extractable ash, crude fibre and total NFE as 40.86, 4.16, 1.55, 2.16, 1.28 and 90.85, respectively.

Majority of plasma proteins like albumin and globulins are produced in the liver, so the estimation of total proteins in the body is helpful in differentiating between normal and damaged liver. A decrease in serum total protein may reflect increased protein loss or decreased protein synthesis. Almost all proteins are synthesised in the liver, hence, hepatic damage is a cause of decreased serum protein. Total protein is often reduced slightly but the albumin to globulin ratio declines during hepatocellular injury (Dufour *et al.*, 2000) [3].

Materials and Methods

Broiler pre-starter, starter, and finisher rations were formulated as per ICAR- 2013 recommendations (Table 1) using Maize, Soyabean meal, Vegetable oil and other micronutrients (Table 2). In the test diets, Jamun seed, an unconventional feed supplement, was included at three different levels (0.5, 1 and 1.5 percent).

Two hundred and forty commercial chicks were wing banded, weighed and randomly distributed to four treatment groups of five replicates each in a completely randomized design.

Each of the four diets described above were offered to five such replicates of twelve birds each. Experiment was carried out under a deep litter system up to six weeks of age, with a supply of *ad libitum* feed and water.

Table 1: Dietary description

Groups	Treatment
T ₁	Control diet
T ₂	0.5% Jamun seed inclusion in the control diet
T ₃	1% Jamun seed inclusion in the control diet
T ₄	1.5% Jamun seed inclusion in the control diet

Table 2: Composition of starter diet

Ingredient	T ₁	T ₂	T ₃	T ₄
Maize	54.50	54.40	53.80	53.50
Soyabean meal	37.00	36.70	36.90	36.80
Vegetable oil	4.30	4.20	4.10	3.90
Jamun seed	0	0.50	1.00	1.50
Mineral mixture*	1.50	1.50	1.50	1.50
Dicalcium phosphate	1.35	1.50	1.50	1.50
Salt	0.38	0.38	0.38	0.38
Vitamin premix**	0.20	0.20	0.20	0.20
DL-Methionine	0.48	0.48	0.48	0.48
Lysine	1.20	1.20	1.20	1.20
Choline chloride	0.10	0.10	0.10	0.10
Total	99.97	100.04	100.04	100.02
ME (Kcal/kg)	3068.65	3068.94	3064.37	3054.75
Crude protein (%)	21.55	21.44	21.51	21.47
Calcium (%)	2.01	2.02	2.01	2.01
Phosphorous (%)	0.61	0.61	0.61	0.61
Lysine (%)	1.15	1.05	1.15	1.15
Methionine (%)	0.50	0.51	0.50	0.50

- Mineral mixture: Each 100 g contains Ferrous sulphate - 6.0 g, Magnesium oxide - 1.48 g, Copper sulphate - 0.05 g, Potassium iodide - 0.001 g, Manganese sulphate - 0.04 g, Potassium chloride - 17.0 g and Sodium selenite - 0.001 g.
- Vitamin Premix: Each 100 g contains Vitamin AD3 (Vitamin A-10,00,000 IU/g, Vitamin K3 - 0.103 g, Vitamin D- 2,00,000 IU/g) - 0.165 g, Vitamin E - 2.4 g, Thiamine mononitrate 0.206 g, Riboflavin - 0.513 g,

Pyridoxine hydrochloride - 0.309 g, Folic acid - 0.103 g, Cyano cobalamine - 0.00031 g, Niacin - 4.124 g, Ca-D-Pantothenate - 1.031 g, Biotin - 1.5 g, Maltodextrine - 89.545 g.

Blood samples were collected from two birds of each replicate at the end of the trial from all treatment groups. Serum was separated individually and subjected for the estimation of serum biochemical parameters.

Results and Discussion

Table 3 summarizes the mean blood protein values under different groupson 42nd day of the experiment and graphically summarized in figure 1.

On day 42, the birds supplemented with different dietary treatments revealed mean serum total protein values as 2.71 g/dl in control group (T₁), 3.07 g/dl in 0.5 percent Jamun seed fed group (T₂), 2.64 g/dl in 1 percent Jamun seed fed group (T₃) and 2.55 g/dl in 1.5 percent Jamun seed fed group (T₄). The serum total protein was not significantly ($p \geq 0.05$) differed among the treatment groups.

On day 42, the birds supplemented with different dietary treatments revealed mean serum albumin values as 1.69 g/dl in control group (T₁), 1.72 g/dl in 0.5 percent Jamun seed fed group (T₂), 1.60 g/dl in 1 percent Jamun seed fed group (T₃) and 1.63 g/dl in 1.5 percent Jamun seed fed group (T₄). The serum albumin was not significantly ($p \geq 0.05$) differed among the treatment groups.

On day 42, the birds supplemented with different dietary treatments revealed mean serum globulin values as 1.06 g/dl in control group (T₁), 1.30 g/dl in 0.5 percent Jamun seed fed group (T₂), 0.95 g/dl in 1 percent Jamun seed fed group (T₃) and 1.01 g/dl in 1.5 percent Jamun seed fed group (T₄). The serum globulin was significantly ($p \leq 0.05$) differed between the treatment group fed with 0.5% Jamun seed (T₂) and other two groups (T₃ and T₄).

On day 42, the birds supplemented with different dietary treatments revealed mean A / G ratio values as 1.62 in control group (T₁), 1.34 in 0.5 percent Jamun seed fed group (T₂), 1.72 in both 1 and 1.5 percent Jamun seed fed groups. The A/G ratio was not significantly ($p \geq 0.05$) different among the treatment groups.

Table 3: Blood protein parameters of birds fed with different levels of Jamun seed on 42nd day

Dietary description		Total Protein* (g/dl)	Albumin (g/dl)	Globulin* (g/dl)	A/G Ratio
T ₁	Control diet	2.71 ^{ab} ±0.05	1.69±0.04	1.06 ^{ab} ±0.05	1.62±0.08
T ₂	0.5% Jamun seed inclusion in the control diet	3.07 ^a ±0.14	1.72±0.05	1.30 ^a ±0.05	1.34±0.07
T ₃	1% Jamun seed inclusion in the control diet	2.64 ^b ±0.052	1.60±0.04	0.95 ^b ±0.05	1.72±0.07
T ₄	1.5% Jamun seed inclusion in the control diet	2.55 ^b ±0.12	1.63±0.06	1.01 ^b ±0.09	1.72±0.14
F value		4.8	1.09	5.77	3.17

*Means bearing different superscripts within the column are statistically significant at $p \leq 0.05$.

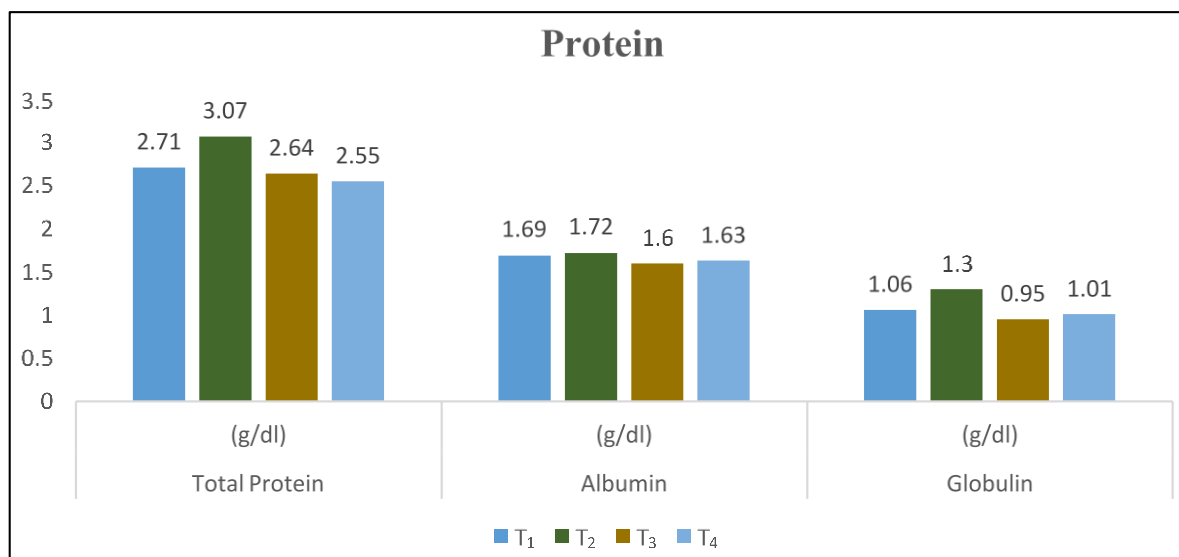


Fig 1: Serum total protein, albumin and globulin values on 42nd day in broilers supplemented with Jamun seeds

Results signifies that there is no effect of tannins present in the Jamun seeds (Kumar *et al.*, 2009) [6] on serum biochemistry (Dufour *et al.*, 2000, Doyle *et al.*, 2009 and Olafedehan *et al.*, 2010) [3, 2, 10]. Blood chemistry of Giriraja birds fed with Jamun seeds up to 4 percent showed non significant differences among different treatments (Sravani *et al.*, 2023) [11].

Conclusion

Blood protein values though variable, inclusion of 1.5% Jamun (*Syzygium cumini*) seeds in broilers had no adverse effects.

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