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Adarsh J
Department of Animal Nutrition, Veterinary College, Karnataka Veterinary Animal and Fisheries Sciences University, Bengaluru, Karnataka, India

Suma N
Department of Animal Nutrition, Veterinary College, Karnataka Veterinary Animal and Fisheries Sciences University, Bengaluru, Karnataka, India

Vivek M Patil
Department of LPM, Veterinary College, Bengaluru, Karnataka, India

Naveen Kumar S
Department of AGB, Veterinary College, Karnataka Veterinary Animal and Fisheries Sciences University, Bengaluru, Karnataka, India

Mamatha HS
Department of Food Science and Nutrition, UAS, GKVK, Bangalore, Karnataka, India

Jyothi MS
No. 1, Dr. B.R. Ambedkar Veedhi, Coffee Board Bengaluru, Karnataka, India

Navyashree G
Department of Animal Nutrition, Veterinary College, Karnataka Veterinary Animal and Fisheries Sciences University, Bengaluru, Karnataka, Karnataka, India

Corresponding Author:
Suma N
Department of Animal Nutrition, Veterinary College, Karnataka Veterinary Animal and Fisheries Sciences University, Bengaluru, Karnataka, India

Evaluation of performance indices of broilers fed with Jamun (*Syzygium cumini*) seeds

Adarsh J, Suma N, Vivek M Patil, Naveen Kumar S, Mamatha HS, Jyothi MS and Navyashree G

Abstract
An experiment was planned in to evaluate the inclusion of Jamun (*Syzygium cumini)* seeds in commercial broilers. We have procured 240 day old chicks from commercial hatchery. Divided these chicks in four treatment groups. Each treatment contained five replicates 12 birds. 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 T_1 to T4 were formulated in all phases by including Jamun (*Syzygium cumini)* seeds at 0%, 0.5%, 1% and 1.5% in that order. Total experimental period was for 42 days. End results showed better performance even at higher level of jamun seed inclusion. Performance indices evaluated were found to be statistically similar among all the treatments. So we concluded the trial for inclusion of 1.5% Jamun (*Syzygium cumini)* seeds in broilers.

Keywords: Jamun, broilers, finisher, performance

Introduction
The Indian poultry market, consisting of broilers and eggs was worth INR 1,750 billion in 2018. The market is further projected to reach INR 4,340 billion by 2024, at a Compound annual growth rate of 16.2% during 2019 - 2024 (Govt. of India, 2019) [3]. Globally poultry production is expected to increase from 24.82 billion (2016) to 25.57 billion in 2030 and 27.68 billion in 2050 (Magnusson *et al*., 2019) [5].

The shortage of feed resources for livestock and poultry feeding diverted most of the research in the field of animal nutrition to investigate possibilities to overcome the crisis. A possible and perhaps the most viable proposition could be the inclusion of non-conventional feed resources in livestock rations with suitable and complete feed technology that can utilize the feed sources with maximum efficiency (Amata, 2014) [2].

Agro-industrial by-products like brewers' dried grain, cashew apple waste, cashew nutshell, rice kani (broken rice), bajra, ragi, palm oil, poultry hatchery waste and legume green fodder (cowpea leaf meal) are having good nutritive value for poultry feed formulations (ICAR, 2014) [4].

An experiment was conducted to assess the feeding value of broken rice for laying Japanese quails (Swain *et al*., 2006) [9]. 96 Quail layers of 10 weeks old were divided in to four equal groups (3 replicates of 8 quails each) and were offered control diet or diet containing 2.4, 4.8 or 7.2% broken rice by replacing 0, 5, 10 and 15% maize w/w. The results showed significantly higher egg production with better feed conversion ratio in the treatment groups than control. The economics of production was better in group fed 2.4% rice kani. Hence, it was concluded that broken rice can be included at 2.4% level in the diet of Japanese quail layers by substituting 5% maize for better economics of production.

The Java plum bean has received little research attention. However, a few studies have been done on the Java plum beans and other parts of the plant mainly to determine phytochemical composition. Furthermore, the beans have a nutritional potential as an energy source because they are known to be rich in carbohydrates (Pankaj, 2003) [6]. The tree fruits once in a year and the berries are sweetish sour to taste. The ripe fruits are used for health drinks, making preserves, squashes and jellies wine (Warrier *et al*., 1996) [11].

Growing awareness among consumers about diet and health has increased the interest in natural antioxidants. Hence, the usage of Jamun seed in the broiler diet may induce some good results when it is used as an unconventional feed supplement.

A study indicated significant increase in body weight gain due to incorporation of processed hatchery waste at different levels in the diet of chicks at 7 weeks of age. Significant improvements in feed conversion ratio, protein efficiency ratio and performance index in chicks were observed. Maximum net profit was recorded due to feeding of 8% PHW (Swain *et al*., 2011) [10].

Materials and Methods

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

Performance indices

The relative cost of all the experimental diets was determined by considering the prevailing prices of the constituent feed ingredients as well as feed additives. The performance index score (PIS) and the economic index score (EIS) were thus calculated as follows:

$$PIS = \frac{\text{Gram average body weight x \% Livability}}{\text{FCR x No. of days reared x 10}}$$

$$EIS = \frac{PIS}{\text{Cost of diet (Rs./kg)}}$$

Data generated was analyzed by standard methods (Snedecor and Cochran, 1995) [7].

Results and Discussion

Chemical composition of Jamun seeds and experimental diets

Chemical composition of sun dried Jamun seeds for proximate composition is presented in the table 2.

Table 2: Proximate composition of dried Jamun seed samples on DM basis

Constituent	Per cent
Organic matter	95.11
Crude protein	5.10
Ether extract	0.57
Crude fiber	4.07
Total ash	4.89
Nitrogen free extract	85.37

Performance indices

Performance index score (PIS)

The values of performance index score for 42 days trial for various dietary treatment groups were 360.5 in control group (T_1), 365.9 in 0.5 per cent Jamun seed fed group (T_2), 363.7 in 1 per cent Jamun seed fed group (T_3) and 343.3 in 1.5 per cent Jamun seed fed group (T_4). Statistical analysis revealed no significant (p>0.05) difference among different dietary treatment groups.

Economic index score (EIS)

The values of economic index score for 42 days trial for various dietary treatment groups were 12.82 in control group (T_1), 13.08 in 0.5 per cent Jamun seed fed group (T_2), 13.13 in 1 per cent Jamun seed fed group (T_3) and 12.42 in 1.5 per cent Jamun seed fed group (T_4). Statistical analysis revealed no significant (p>0.05) difference among different dietary treatment groups.

Table 3: Effect of supplementing Jamun seed on performance index score (PIS) and economic index score (EIS)

Description		PIS	EIS
T_1	Control diet	360.5±11.08	12.82±9.62
T_2	0.5% Jamun seed inclusion in the control diet	365.9±5.02	13.08 ± 6.34
T_3	1% Jamun seed inclusion in the control diet	363.7±13.70	13.13±11.25
T_4	1.5%Jamun seed inclusion in the control diet	343.3±8.62	12.42±7.45
F value		6.16	8.42

Less feeding trials are available to calculate performance indices in commercial birds. But however, Adarsh *et al*. (2022) [1] recorded higher body weights of broilers when 1% Jamun (*Syzygium cumini)* seeds were included in diet at 4th week of age. Later studies (Sravani *et al*., 2022) [8] suggested to include higher levels i.e., 4% Jamun seeds inclusion in diet of coloured giriraja birds.

Conclusion

Good results in all aspects were recorded at 1.5% Jamun (*Syzygium cumini)* seeds in broilers.

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