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Impact of feeding powdered coriander (*Coriandrum sativum*) seeds on broiler chicken growth and sensory attributes

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Abstract

The current study, "Impact of feeding powdered coriander (*Coriandrum sativum*) seeds (PCS) on broiler chicken growth and sensory attributes," was carried out between June and August 2023 at the Poultry farm of the Animal Husbandry and Dairy Science division, College of Agriculture, Dhule (Maharashtra). For 45 days, 120 broiler chicks were reared on a deep litter system. Chicks were randomly assigned to one of four groups (each with 30 chicks), with four treatment blocks and five replications. The control group (T₀) received no dietary treatment, whereas PCS was given to the experimental meals at 0.5%, 1.0%, and 1.5% concentrations for treatments T₁, T₂ and T₃, respectively. Body weight and feed consumption were monitored weekly and the feed conversion ratio (FCR) was computed appropriately. At the conclusion of the sixth week, one bird from each treatment was slaughtered in order to determine the sensory evaluation of broiler chicken. When compared to other treatments, the use of PCS significantly ($p < 0.05$) boosted body weight growth. When compared to the control, broiler meat fed with PCS had considerably greater juiciness and overall approval. Colour, flavour and tenderness were also significantly affected ($p < 0.05$) in the coriander-treated group as compared to the control group.

Keywords: Broiler, coriander, FCR, growth performance, sensory evaluation

Introduction

During 2022-23, the country's total egg production 138.38 billion eggs. In terms of overall egg production, India ranks third in the world fifth-largest broiler producer (source: FAO). The Indian poultry market had a rise in demand over the past five years, rising at an 8.1% compound annual growth rate (CAGR). In comparison to the previous year 2021-22, egg production has grown by 6.77%. Egg availability per capita is 101 eggs per year. Andhra Pradesh (20.13%), Tamil Nadu (15.58%), Telangana (12.77%), West Bengal (9.93%), and Karnataka (6.51%) are the top five egg production states. They account for 64.93% of total output in the country. The overall egg production from commercial poultry is 118.16 billion numbers, while backyard poultry output is 20.20 billion numbers, accounting for 85.40% and 14.60% of total egg production, respectively.

Poultry farming has evolved as one of the most profitable and well recognized sectors for employing educated young people. Broiler production is the most popular among poultry producers because to its rapid returns, little area needs and higher weight growth. The productive potential of chicken in India has not been completely used due to insufficient feed supply and underutilization of available improved technology for generating high output from poultry at a reasonable rate. As a result, increasing the feeding value of available feed resources is critical to achieving optimum feed utilization efficiency and lowering the cost of feed per kilogram of live weight growth. Because of concerns about antibiotic residues in tissue and the development of bacterial resistance, the use of antibiotics as growth promoters in chicken has been restricted.

Herbs and spices have been extensively explored in chicken feeds as growth enhancers and antibiotic alternatives. It is useful to feed medicinal herbs to chickens in order to fulfill customer expectations and legislative regulations regarding the avoidance of the use of antibiotic growth promoters and ionophores in current intensive poultry production (Adhikari *et al.*, 2019) [2]. Consumers want meat with good sensory and preservation quality, which sustainable animal products give (Socaci *et al.*, 2020) [16]. The effects of phytochemicals are connected to their unique phytochemical ingredients. By improving poultry digestion and immunity, the bioactive substances improve the potential output of chicken.

They keep sickness at bay and maintain a healthy balance of intestinal uptake and gut bacteria. These advantages can be obtained by integrating several medicinal plants into broiler breeding feed or water (Seidavi *et al.*, 2021) [13]. Feed additives can also provide antioxidants and bioactive antibacterial compounds. One of the spices is coriander. It is a medicinal and spice plant with beneficial biological qualities such as antibacterial, antioxidant and anti-inflammatory capabilities (Silva *et al.*, 2020) [14]. Coriander seed supplementation in poultry feed improves zoo technical performance, carcass yield, blood biochemical profile, and mineral content of chicken meat (Jameel, 2019) [7]. Coriander seed powder has been used in chicken feed as an alternative for antibiotics to treat infectious bronchitis and Newcastle disease, according to Hosseinzadeh *et al.*, (2014) [6].

Materials and Methods

For the current investigation, one hundred twenty-day-old (Vencobb-400) broiler chicks were acquired from Nidhi poultry Medicare, Dhule. All of the experimental chicks were weighed separately. Following that, chicks were randomly assigned to one of four treatment groups: T₀, T₁, T₂, and T₃, with 30 chicks in each group. The current study was carried

out in the chicken farm of the department of Animal Husbandry and Dairy Science, College of Agriculture, Dhule, (MS) India, from June 23 to August 6, 2023.

Body weight and feed consumption were measured at weekly intervals up to the sixth week of life. Feed conversion efficiency was calculated as the amount of feed eaten per kilogram increment in body weight. The ratio of body weight (kg) to feed conversion efficiency (kg) was multiplied by 100 to get performance efficiency (%). At the end of the study, one chicken from each treatment was chosen at random and killed to estimate the dressing percentage.

Sensory Evaluation: The meat sensory evaluation of the dressed birds was also performed. Five semi-potential panelists were chosen from the Division of Animal Husbandry and Dairy Science at Dhule College of Agriculture. Using a 9-point hedonic scale, evaluated the sample for appearance, flavor, juiciness, texture/tenderness, and overall acceptability. The data acquired throughout the study were statistically evaluated using Snedecor and Cochran's (1994) [15] Completely Randomized Design (CRD).

Feed Intake

$$\text{Weekly feed intake(g/bird)} = \frac{\text{Total feed intake by all birds in treatment during a week}}{\text{No. of live chicks in the treatment during that week}}$$

Feed conversion ratio

$$\text{FCR} = \frac{\text{Feed consumption (g) during the week}}{\text{Gain in body weight (g) during the week}}$$

Results and Discussion

Cumulative body weight (g)

The body weight changes of chicks showed a significant difference between treatment groups from the third week onwards, except for birth weight and the first two weeks (Table 1). Group T₃ (745.77 g) and (1190.93) body weights were very significant ($p < 0.05\%$) in the third and fourth weeks. T₁ and T₂ treatments, on the other hand, were comparable. Group T₃ had the greatest cumulative body weight change in the fifth week of life (1679.62), followed by T₂, T₁ and control. Group T₃ (2250.56 g) had a substantially ($p < 0.05\%$) greater body weight at the conclusion of the sixth week, followed by T₂, T₁, and control. The findings of this investigation are consistent with those of Khubeiz *et al.*, (2020) [8], who discovered that coriander seed powder at 1.5% demonstrated the greatest live body weight. According to Abou-Elkhair *et al.*, (2014) [1] chicks treated with varied quantities of Coriander seed powder, i.e., 1.5%, raised their body weight considerably when compared to the control group. Essa *et al.*, (2011) [5] shown that 0.5% and 1% coriander oil significantly ($p < 0.05\%$) improved body weight.

Body weight gain: During the first two weeks, there was no significant difference in live body weight growth between treatments as shown in table 2. From the third to the sixth week of the trial, there was a substantial difference between all treatments. In the third week, treatment T₃ (312.81 g) had the biggest weight increase, followed by T₂ and T₁, which were both at par. The treatment T₃ (445.16 g) gained the most body weight during the fourth week ($p < 0.05\%$), followed by T₂, T₁, and control. Treatment T₃ (488.69) gained the most

weight at the fifth week, followed by T₂, T₁, and control.

At the sixth week, the average body weight of experimental chicks for treatments T₀, T₁, T₂, and T₃ was 477.21 g, 488.83 g, 518.96 g, and 570.94 g, respectively. T₃ had the biggest body weight gain (570.94 g), followed by T₂, T₁, and control ($p < 0.05\%$). The current findings are also consistent with the findings of Saeid and Al-Nasry (2010) [11], who indicated that supplementation of coriander seed at 0.3% of diet leads in the greatest body weight growth. According to Khubeiz *et al.*, (2020) [8], greater weight increase was seen in broilers fed 0% (T₁) as a control, 1.5% (T₂), 2.5% (T₃), and 3.5% (T₄) coriander seed powder. The introduction of 1.5% PCS had a beneficial effect on weight growth.

Feed Intake and Feed Efficiency: The overall average feed intake of experimental broiler chicks at six weeks of age for treatments T₀, T₁, T₂, and T₃ was 3742 g, 3759 g, 3783 g, and 3860 g, respectively (Table 3). During the six-week trial, however, the difference in feed intake was considerable in all treatment groups. The average weekly feed intake of the birds for treatments T₀, T₁, T₂, and T₃ at the sixth week was 905.19 g, 945.12 g, 988.48 g, and 1010.12 g, respectively. From the third to the sixth week of the trial, a substantial change was seen. The findings are consistent with the findings of Rashid *et al.*, (2014) [10] and Saleh *et al.*, (2014) [12] who found a significant ($p < 0.05\%$) difference between treatments in birds given coriander seed powder at varying doses.

During the first two weeks of the FCR, all therapies were non-significant (Table 4). From the third to the sixth week, a statistically significant change was seen. Six weeks later, the total feed conversion ratio for treatments T₀, T₁, T₂, and T₃ was 1.89, 1.76, 1.73, and 1.68, respectively. Treatment T₃ (1.68) had a statistically higher FCR than the other treatments. The study's findings are consistent with those of Neemasa *et al.*, (2015) [9] who conducted an experiment on the supplementation of PCS at concentrations of 0.5%, 2.0%, and

2.5%. Throughout the experiment, the introduction of coriander powder in the diet enhanced feed conversion ratios. According to Khubeiz *et al.*, (2020) [8] the introduction of PCS at 1.5% ($p < 0.05$) had a beneficial influence on the feed conversion ratio.

Sensory evaluation of broiler chicken

The taste panelists loved the diverse treatments of broiler meat and scored it good to very good for several sensory aspects such as color, flavor, juiciness, tenderness, texture,

and overall acceptability (Table 5). When compared to the control and standard groups, the broiler meat of the coriander seed powder supplemented group had considerably ($p < 0.05$) greater juiciness and overall approval. Color, flavor, and tenderness were all improved in the coriander-treated group as compared to the control and standard groups. The findings were supported by the findings. According to Barad *et al.*, (2016) [3] coriander seed administration at 2% increased body weight growth (g/bird) without affecting sensory parameters.

Table 1: Effect of feeding different levels of coriander seed powder on cumulative body weight (g) of broiler

Weeks	Treatments				SE (±)	CD @ 5%
	T ₀ (Control)	T ₁ (0.5%)	T ₂ (1.0%)	T ₃ (1.5%)		
Initial	48.23	48.43	48.50	48.62	2.10	NS
first	191.42	198.66	200.73	204.36	8.68	NS
Second	400.24	413.09	419.16	432.96	18.21	NS
Third	699.26 ^c	723.01 ^b	730.36 ^{ab}	745.77 ^a	5.57	16.71
Fourth	1099.00 ^c	1147.35 ^b	1160.39 ^b	1190.93 ^a	5.75	17.24
Fifth	1567.01 ^d	1624.72 ^c	1641.51 ^b	1679.62 ^a	4.51	13.52
Sixth	2055.22 ^d	2113.55 ^c	2160.47 ^b	2250.56 ^a	5.14	15.43

Table 2: Effect feeding of different levels of coriander seed powder on weekly body weight gain (g) of broiler

Weeks	Treatments				SE (±)	CD @ 5%
	T ₀ (Control)	T ₁ (0.5%)	T ₂ (1.0%)	T ₃ (1.5%)		
First	143.19	150.23	152.23	155.74	6.58	NS
Second	208.82	214.43	218.43	228.60	9.53	NS
Third	299.02 ^c	309.92 ^b	311.2 ^{ab}	312.81 ^a	1.53	4.58
Fourth	399.74 ^d	424.34 ^c	430.03 ^b	445.16 ^a	1.36	4.09
Fifth	468.01 ^c	477.37 ^b	481.12 ^b	488.69 ^a	1.75	5.26
Sixth	477.21 ^d	488.83 ^c	518.96 ^b	570.94 ^a	1.87	5.61

Table 3: Effect of feeding different levels of coriander seed powder on weekly feed intake (g) of broiler

Weeks	Treatments				SE (±)	CD @ 5%
	T ₀ (Control)	T ₁ (0.5%)	T ₂ (1.0%)	T ₃ (1.5%)		
First	197.63	185.20	183.41	181.32	5.17	NS
Second	384.53	376.42	378.24	375.18	6.34	NS
Third	617.47 ^d	620.19 ^c	618.63 ^b	624.50 ^a	0.46	1.40
Fourth	803.94 ^d	804.23 ^c	800.29 ^b	813.24 ^a	0.96	2.88
Fifth	833.24 ^d	828.58 ^c	814.83 ^b	856.15 ^a	0.92	2.76
Sixth	905.19 ^d	945.12 ^c	988.48 ^b	1010.12 ^a	1.76	5.28
Total	3742	3759	3783	3860	2.100	6.29

Table 4: Effect of feeding different levels of coriander seed powder on weekly feed conversion ratio of broiler

Weeks	Treatments				SE (±)	CD @ 5%
	T ₀ (Control)	T ₁ (0.5%)	T ₂ (1.0%)	T ₃ (1.5%)		
First	1.38	1.23	1.20	1.16	0.06	NS
Second	1.84	1.75	1.73	1.64	0.07	NS
Third	2.06 ^c	2.00 ^b	1.98 ^a	1.99 ^b	0.017	0.05
Fourth	2.01 ^c	1.89 ^b	1.86 ^b	1.82 ^a	0.029	0.08
Fifth	1.78 ^c	1.73 ^b	1.69 ^a	1.75 ^b	0.020	0.06
Sixth	1.89 ^d	1.93 ^{bc}	1.90 ^{ab}	1.76 ^a	0.016	0.04
Overall	1.82 ^d	1.76 ^c	1.73 ^b	1.68 ^a	0.014	0.04

Table 5: Effect of feeding different levels of coriander seed powder on sensory evaluation of broilers

Parameter	Treatments				SE (±)	CD @ 5%
	T ₀ (Control)	T ₁ (0.5%)	T ₂ (1.0%)	T ₃ (1.5%)		
Colour	7.83	7.68	7.77	7.92	0.33	NS
Flavour	7.98	8.01	8.07	8.22	0.35	NS
Juiciness	7.62	7.78	7.85	7.93	0.33	0.99
Texture	7.83	7.50	7.32	7.92	0.33	NS
Overall acceptability	7.30	7.65	7.67	7.70	0.32	0.96

Conclusion

It was determined that feeding PCS in T₃ group (@ 1.5%) in broiler chicken feed generated a substantial increase in cumulative live weight and body weight growth of the birds compared to the other treatments. The effect of feeding PCS in the diet at various dosages had a substantial influence on broiler feed consumption. The impact of PCSs (@ 1.5%) in the (T₃-1.68) group had a higher FCR than the other treatments. When compared to the control, broiler meat fed with coriander seed powder had considerably greater juiciness and overall approval. Colour, flavour and tenderness were also improved in the PCS treated group as compared to the control group.

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