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Effect of amla fruit powder (*Phyllanthus emblica*) and turmeric powder (*Curcuma longa*) supplementation on growth performance parameters in caged broilers

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Abstract

The present investigation was conducted with an objective to evaluate the impact dietary supplementation of Amla fruit powder (*Phyllanthus emblica*) and Turmeric powder (*Curcuma longa*) on the growth performance in caged broiler. The trial was conducted in small animal lab of Department of Animal Husbandry and Dairying SHUATS, Prayagraj, India. The experimental day old chicks were divided into 4 groups. Each group consisting of 12 chicks was designated as group T₀, T₁, T₂ and T₃. Each group was divided into 4 replicates. Chicks in group T₀ were fed basal diet, while group T₁ were fed basal diet + Amla Fruit Powder @0.50%, T₂ were fed basal diet + Turmeric Powder @0.50%, T₃ were fed basal diet + Amla Fruit Powder + Turmeric Powder @0.50%. During four weeks experimental period. Mean initial and weekly body weight and gain in weight of birds for each group was determined and then body weight and gain in weight was calculated. A significant difference in the body weight and Gain in weight was recorded at fourth weeks of age due to treatments.

Keywords: Amla, broiler, turmeric, gain in weight, weekly body weight

Introduction

Amla is one of the richest sources of ascorbic acid (vitamin C), minerals, amino acids, tannins and phenolic compound. Rapid growth rate in commercial boiler acceleration the metabolism rate and make them vulnerable to oxidation stress owing to increased free radical generation. Gallic rate and tannic acids are the phenolic acid present in (*Phyllanthus emblica*) contributes to the antioxidant activity in addition ascorbic acid.

Herbs like Amla, Turmeric were used as anti- stress factors for many years in human and animal medicines with proven results. These herbals are used as medicinal plants for various functions like antibacterial; antiseptic; antiviral; antifungal; anti-inflammatory and immunomodulatory properties. Many herbs are known to have positive effects in strengthening host immune system and to avoid immunosuppression. Besides usage of these herbs for medicinal preparations they can also be included in poultry diet as feed additive to utilize their benefits to themaximum extent. Amla is one of the richest sources of Vitamin-C and several active tannoid principles (Emblicanin; Punigluconin and Pedunculagin) have been identified that account for it's health benefits (Singh *et al.*, 1993, Bhandari & Kamdod. 2012) [3, 2]. Turmeric and Curcumin (yellow pigment) have been shown to protect liver against a variety of toxicants like aflatoxin-B1 (Zhang *et al.*, 2016) [11]. Therapeutic properties includes antibacterial; anti-oxidant; antiprotozoal; hypocholesteremic (Chattopadhyay *et al.*, 2004) [4]. Certain curcumin metabolites, such as tetrahydrocurcumin, possess anti-inflammatory (Singh & Khar. 2006) [9] and anti-oxidant activities (Sultan *et al.*, 2003) [1].

Turmeric is a natural anti inflammatory, powerful antioxidant. Turmeric has anticancer effect. Turmeric may help with the skin condition. Turmeric might be brain food. Getting the most form of turmeric the active ingredients found in turmeric (*curcuma longa*) are curcumin demethoxy-curcumin and tetra-hydro-curcumin plant extract were found to have antifungal and antioxidative value. Some pharmacological activities of turmeric and anti inflammatory were demonstrated.

Hence an investigation was carried out by including different levels of amla, turmeric and their combinations in powdered form in diet to study the serum bio-chemical parameters and immune responses in broilers.

Materials and Methods

The trial was conducted in small nutrition lab of Department of Animal Husbandry and Dairying SHUATS, Prayagraj, India. The impact of this examination was assessed as far as exhibitions viz, development, feed utilization, feed change proportion of broilers.

Experimental birds

Forty Eight days old chicks were used in the study. They were kept in the caged in isolated pens and fed commercial ration

and water ad libitum. They were housed in Battery type cages in a small animal laboratory. Broilers were given floor space @ 0.75 sq ft. Each was managed under identical management conditions. The data on body weight and Gain in weight were recorded weekly. The data were analyzed statistically.

Experimental design

The details of experimental design have been described in table 01.

Table 1: Details of Dietary Treatments

Groups	Dietary treatments
T ₀ Control	Standard broiler chicken diet
T ₁	Standard broiler chicken diet + Amla fruit powder @5g/kg feed.
T ₂	Standard broiler chicken diet + Turmeric powder@5g/kg feed.
T ₃	Standard broiler chicken diet + Amla Fruit powder +Turmeric powder @5g/kg feed.

Collections and preparations of ingredients

Preparation of Turmeric Powder: The Turmeric (*curcuma Longa*) rhizomes were purchased as dry roots which were grind into soft powder.

Preparation of Amla Fruit Powder: The Amla (*Phyllanthus Emblica*) fruit were purchased as dry fruit which were grind into soft powder.

The Turmeric powder (*curcuma longa*) and Amla fruit powder (*Phyllanthus Emblica*) was mixed in the broiler ration. The ration was supplemented as per dietary regimes of treatment. Broiler starter ration contained CP 22% and ME:2900kcl and broiler finisher ration contained CP 19%, ME:3000kcl was fed ad libitum to the birds.

Parameters studied

Weekly body weight

The average weekly live weight was calculated from the differences in body weight attained at the start and the end of the concerned period for all the replicates.

Body weight gain

The average body weight gain was calculated at the start and the end of the concerned period for all the replicates.

Analysis of experiment data

The data collected on various parameters were recorded tabulated and statistically analyzed by using Analysis of variance (ANOVA) technique as per Snedecor and Cochran (1994) in RBD consisting of three treatments, one control and four replications.

Results

From the perusal of data on weekly body weight of broilers, contained in Table 2 and 3, it may be noted that mean body weight of broilers, irrespective of weeks at one, two, three, four weeks of age was 609.15 g, 584.64 g, 618.09 g, and 617.18 g, respectively.

The differences in these values were found to be significant, indicating thereby a significant effect of treatments on body weight of broilers chicks.

Table 2: ANOVA for data on weekly body weight of broiler chicks

Treatments	W1	W2	W3	W4	Mean
T ₀	158.77	368.50	739.87	1169.47	609.15
T ₁	159.28	357.20	696.72	1125.37	584.64
T ₂	158.31	372.65	733.45	1207.97	618.09
T ₃	157.37	364.95	749.45	1196.97	617.18
Mean	158.43	365.82	729.87	1174.94	

Table 3: Shows the source and its result

Source	d. f.	S.S.	M.S.S.	F. Cal.	F. Tab. 5%	Result
Replication	3	2924.141	974.71	3.06	3.86	NS
Treatment	3	2388148.2	796049.4241	2500.46	3.86	S
Error	9	2865.24	318.36	-	-	-
Total	15	2393937.66				-

From the perusal of data on weekly body weight of broilers, contained in Table 4, it may be noted that mean gain in body weight of broilers, irrespective of weeks at one, two, three, four weeks of age was 280.91 g, 270.21 g, 291.03 g, and 288.07 g, respectively.

The differences in these values were found to be significant, indicating thereby a significant effect of treatments on gain in weight of broilers chicks.

Table 4: Average weekly means gain in weight (g) per broiler in different treatments

Treatments	W ₁	W ₂	W ₃	W ₄	Mean
T ₀	112.97	210.02	371.07	429.60	280.91
T ₁	114.78	197.91	339.52	428.65	270.21
T ₂	114.48	214.33	360.80	474.52	291.03
T ₃	112.71	207.57	384.50	447.52	288.07
Mean	113.73	207.45	363.97	445.07	

Table 5: ANOVA for data on weekly gain in weight of per broiler

Source	d. f.	S.S.	M.S.S.	F. Cal.	F. Tab. 5%	Result
Replication	3	1029.214	343.0713	1.952	3.86	NS
Treatment	3	268722.2	89574.09	509.90	3.86	S
Error	9	1581.018	175.668			-
Total	15	271332.5				-

Discussion

Similar results on weekly body weight and gain in weight has also been suggested by Reddy *et al.*, 2012 [6], who stated slightly increase in the weight of bursa and spleen with supplementation of herbals. Similarly, Chandra *et al.*, (2019) [3] noticed weight of heart, liver and gizzard increased slightly with supplementation of turmeric and amla which were non-significant. The higher dressing percentage (72.20%) and meat bone ratio (14.36%) were observed in T₆ (0.50% Of Amla and Turmeric in basal diet) on per cent live weight basis.

Supplementation of Amla fruit powder @ 0.5% level enhances the body weight and FCR without any adverse effect and at 1% and 2% level of inclusion the increase in body weight was found to be moderate (Naik *et al.*, 2020) [5].

Conclusion

The mean body weight of chicks day old chicks in different treatments *viz.* T₀, T₁, T₂ and T₃ was 45.83 g, 44.49 g, 43.83 g and 44.66g, respectively. The differences in weight of DOC were non-significant. The mean body weight of broiler chicks at fourth weeks of age, T₀, T₁, T₂ and T₃ was 1169.47 g, 1125.37 g, 1207.97 g and 1196.97 g, respectively. The differences in the body weight of chicks at fourth weeks of age due to treatments were found Significant.

The mean gain in weight of broilers at four weeks of age in T₀, T₁, T₂ and T₃ was 429.60 g, 428.65 g, 474.52 g, and 447.52g, respectively. The differences in the average gain in weight per broilers between the treatments were found Significant.

It may be concluded that there was a beneficial effect of Amla Fruit Powder (*Phyllanthus Emblica*) and Turmeric powder (*curcuma longa*) supplementation in the diet of broilers on body weight and gain in weight broilers. According to body weight and gain in weight, T₂ i.e., mixture of Turmeric powder (*curcuma longa*) @ 5g/kg feed was found to be best compared to all treatments .

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