

ORIGINAL ARTICLE

Influence of Dietary supplementation of Mentha leaf powder and vitamin C on growth performance of caged broilers

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ABSTRACT

The purpose of this research work was to evaluate the Mentha leaf powder (*Mentha Ppiperata*) and Vitamin C (Ascorbic acid). A total of 81 day old chicks were used in this study. Nine levels of a Mentha leaf powder and vitamin C at the rate of 0.00 (T₀), 2.50 g Mentha leaf powder (MLP)/kg (T₁), 5.00 g Mentha leaf powder (MLP)/kg (T₂), 250 mg vitamin C/kg (T₃), 500 mg vitamin C (T₄), 2.50 MLP/kg + 250mg vitamin C (T₅), 2.50 MLP/kg + 500mg vitamin C (T₆), 5.00 MLP/kg + 250mg vitamin C (T₇), and 5.00 MLP/kg + 500mg vitamin C (T₈) were incorporated into the basal diet for five weeks. Feeding period for all groups was lasted for 35 days. Results revealed a significant effect of menthe leaf powder and vitamin C in feeds on body weight and gain in weight ($P < 0.05$) of broilers. It was concluded from this study that 2.50 MLP/kg + 250mg vitamin C (T₅) feed supplemented has a beneficial impact on the growth performance of broilers.

Key words: Broilers, Mentha, Vitamin C, Growth performance and gain in weight

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INTRODUCTION

The use of medicinal plants in the poultry industry has become popular and requires selecting the most suitable plant. Different studies have proved the antimicrobial properties of some medicinal plants in human laboratory [1-3]. Nowadays the use of medicinal supplements as antibiotic growth promoters has developed in broiler farms. On the other hand, some studies have shown some adverse effects that resulted from the use of some antibiotic growth promoters [4-5]. The extensive use of these antibiotics in broiler farms has some problems such as rising production costs and compromising the health of the society because of consuming the products with pharmaceutical residues. Studies show that using medicinal plants can play an effective role in producing healthy products (organic) besides improving production [6-13]. Peppermint is a member of the Labiate family and one of the world's oldest medicinal herbs [14-17]. The Labiate family, rich in essential oil, has commercial and medicinal values. These herbs are widespread throughout the world and are widely use in food, flavor, cosmetic, and pharmaceutical industries [18-22]. The chemical components of peppermint are menthol, methane, 1,8-cineole, methylacetate, methofuran, isomenthone, limonene, b-pinene, a-pinene, germacrene-d, trans-sabinene hydrate, and pulegone [9]. Menthol is the main phenolic component in oil of peppermint, which has antibacterial activities [11]. Studies have shown that this plant has antiseptic, spasmolytic, and disinfectants properties. Therefore, it improves carcass traits in broiler production. This study aimed to assess the effect of different levels of peppermint powder on the production of broilers and some blood biochemical parameters at different periods of training in broilers.

MATERIALS AND METHODS

A total of 81 DOC of same hatch were randomly distributed into nine groups with three sub groups comprising of three birds in each. Broilers in T₀ were fed diet as per (NRC, 1994) standard (CP 22 and ME 2900) but broilers in 2.50 g Mentha leaf powder (MLP)/kg (T₁), 5.00 g Mentha leaf powder (MLP)/kg (T₂), 250 mg vitamin C/kg (T₃), 500 mg vitamin C (T₄), 2.50 MLP/kg + 250mg vitamin C (T₅), 2.50 MLP/kg

+ 500mg vitamin C (T₆), 5.00 MLP/kg + 250mg vitamin C (T₇), and 5.00 MLP/kg + 500mg vitamin C (T₈) were incorporated into the basal diet for five weeks. All broilers were offered feed and water *ad libitum* throughout the experimental period. They were housed in metal type battery cages in small animal laboratory of animal husbandry and Dairying, SHUATS Prayagraj. A bulb of 15 watt was left on in each cage. Initial weight of each chick was recorded on arrival and then weekly.

Ingredient and nutrient composition of experimental diet (%DM)

Ingredients (%)	Broiler starter (0 - 21 days)	Broiler finisher (22 - 42 days)
Maize	60.00	63.00
Ground nut cake	23.11	18.00
Fish meal	12.60	14.60
Premix*	2.50	2.50
Salt	0.30	0.30
Méthionine	0.10	0.01
Lysine	0.10	0.01
Di-calcium phosphate	1.20	1.20
Total	100	100.00
Calculated Chemical analysis		
Moisture (%)	6.29	6.22
Crude Protein (%)	23.29	21.28
Total Ash (%)	8.02	9.34
CP	22.00	19.00
ME (Kcal/Kg)	2900	3000
Calcium (%)	0.69	0.52
Available phosphate (%)	0.74	0.69
Methionine (%)	0.33	0.31
Lysine (%)	1.19	1.08

*Premix (2.5%) Provided the following (Per Kg of complete diets). Vit A. 367500 IU, 133500 IU Vit. D3, 1920 mg Vit.E, 84.42 Vit. K3, 50 mg Vit. B1, 150 mg Vit. B2, 500 mg Vit. B3, 177.5 mg Vit. B6, 0.8 mg Vit. B12, 600 mg Vit. PP, 24.5 mg folic acid, 27 mg biotin, 5767.5 mg choline, 2667 mg Fe, 333.75 mg Cu, 3334.06 mg Mn, 203 mg Co, 2334.38 mg Zn, 100.75 mg Ca, 10 mg Se, 65446.46 mg Ph, 36667.5 mg DL Methionine, 200.02mg, Ethoxyquin, 50mg Flavophospholipol, 30g Fish meal, 1800g wheat bran.

Green Mentha leaves were dried for three to four days initially and then in oven at 60°C up to moisture content level below 10%. Then the leaves were crushed manually to make it fine. It was passed through fine meshed wire sieve to obtain uniform powder. Then it was mixed with standard feed mixture according to the ratio mentioned. Chicks were provided 0.8 sq.ft/bird space. Cages, feeders, waterers, and other equipments were properly cleaned disinfected and sterilized before use. The waterers were disinfected with 0.02%KMnO₄ solution every day. The average live body weight, body weight gain, feed intake, mortality percent and feed conversion ratio were measured on weekly basis. The Data obtained were subjected to statistical analysis using ANOVA. In case of significance difference Duncan Multiple Range Test was applied.

RESULTS AND DISCUSSION

Weekly average body weight (g) of broilers:

The data regarding weekly body weight of broilers distributed in nine treatments of different combinations effect of Mentha of vitamin C (T₀ to T₈) are presented in Table 1. It may be noted that irrespective of different treatments mean body weight per broilers in first, second; third, fourth and fifth week was 163.18, 423.30, 799.48, 1199.00 and 1628.91 g respectively. Similarly, the mean weekly body weight of broilers in T₀ to T₈ was 766.19, 869.90, 835.99, 792.84, 841.02, 915.62, 879.55, 874.44 and 809.37g respectively and the differences among them were found significant. T₅ registered highest (915.62g) mean weekly body weight whereas it was lowest in T₀ (766.19 g). However differences among T₀, T₃, T₈, T₂, T₄, and T₁ and also between in T₇ and T₆ were found non-significant. These results are in agreement with the findings [5, 6].

Weekly average gain in weight (g) of broilers:

The data regarding weekly gain in weight of broilers distributed in nine treatments of different combinations effect of Mentha of vitamin C (T₀ to T₈) are presented in Table 2. It may be noted that irrespective of different treatments mean gain in weight per broilers in first, second; third, fourth and fifth week was 119.70, 260.11, 375.44, 399.48 and 428.67 g respectively results were significant.

Similarly the mean weekly gain weight of broilers in T₀ to T₈ was 281.40, 328.80, 314.80, 298.53, 311.20, 342.93, 330.80, 338.60 and 300.73g respectively and the differences among them were found to be significant. T₅ registered highest (342.93 g) mean weekly gain weight where as it was lowest in T₀ (281.40g). However differences among T₇, T₆, T₁, T₂, T₄, T₈, T₃, and T₀ were to be found non-significant. These results are in agreement with the findings [2, 10].

Table 1 Average weekly body weight (g) of broilers in different treatments.

Treat.	Weeks					Mean
	1 st Week	2 nd Week	3 rd Week	4 th Week	5 th Week	
T ₀	152.44	401.33	720.89	1097.00	1459.33	766.19
T ₁	166.00	426.33	805.55	1252.33	1699.33	869.90
T ₂	155.11	406.00	788.66	1213.33	1616.88	835.99
T ₃	158.00	399.00	756.89	1112.33	1537.99	792.84
T ₄ T ₄	169.33	459.33	829.11	1144.67	1602.66	841.02
T ₅	173.22	464.00	856.89	1324.00	1760.00	915.62
T ₆	167.66	434.00	829.11	1267.00	1699.99	879.55
T ₇	165.11	413.33	848.89	1208.67	1736.22	874.44
T ₈	161.77	406.33	759.33	1171.67	1547.77	809.37
Mean	163.18	423.30	799.48	1199.00	1628.91	842.77

Table 2 Average weekly gain in weight (g) of broilers in different treatments.

Treat.	Weeks					Mean
	1 st Week	2 nd Week	3 rd Week	4 th Week	5 th Week	
T ₀	110.67	249.00	318.67	376.00	352.67	281.40
T ₁	120.33	260.33	378.33	446.67	446.33	328.80
T ₂	113.67	250.67	382.00	424.67	403.00	314.80
T ₃	114.33	241.00	356.67	355.67	425.00	298.53
T ₄	123.67	290.00	369.33	315.67	457.33	311.20
T ₅	129.67	290.67	392.33	467.00	435.00	342.93
T ₆	122.67	266.33	394.67	438.00	432.33	330.80
T ₇	123.33	248.33	434.67	359.33	527.33	338.60
T ₈	119.00	244.67	352.33	412.33	375.33	300.73
Mean	119.70	260.11	375.44	399.48	428.67	316.45

CONCLUSION

All birds were managed under identical scientific management condition. The data on body weight were recorded weekly to determine weight gain. The data were analyzed statistically. The results are summarized as follows.

The mean body weight of DOC in different treatments viz., T₀ to T₈ was 41.00, 45.33, 40.67, 42.67, 45.00, 42.67, 44.00, 41.33 and 42.33 g respectively. The mean body weights at fifth weeks of age in different treatments viz., T₀ to T₈ were 1459.33, 1699.33, 1616.88, 1537.99, 1602.66, 1760.00, 1699.99, 1736.22 and 1547.77 g respectively. The difference in body weight of the broilers at fifth weeks of age in different treatments was found significant Table 1 Highest mean body weight of broilers at fifth weeks of age was recorded in T₅ (1760.00 g) and lowest mean was observed in T₀ (1459.33 g). The differences in the values of body weight in broilers at fifth week of age were found significant indicating thereby significant effect of treatments on body weight of broilers.

The mean gain in weight in fifth weeks in different treatments viz., T₀ to T₈ was 1407.01, 1652.00, 1574.01, 1492.67, 1556.00, 1714.67, 1654.00, 1693.00 and 1503.66 g respectively. Table 2. The differences in mean gain in weight of the broilers at fifth weeks of age in different treatments were found non - significant. The highest mean weekly gain in weight of broilers was recorded in T₇ (527.33 g) and lowest in T₀ (352.67g). Differences in the values of weekly gain in weight of broilers were found significant.

It was concluded that there was a significant effect of different treatments of Mentha leaf powder & vitamin C supplementation in feed on body weight, gain in weight, of broilers.

All treatments were significant compared to standard (control).

T₅ (2.5 g Mentha + 250 mg Vitamin C /kg feed) Were highest treatments and significant compared to different levels from Mentha & vitamin C on body weight, gain in weight, compared to other treatments mixed and standard (control). T₀ (standard control) was the lowest treatments compared to other treatments mixed. All treatments were better compared to standard (control) and enhance performance of broilers in heat stress in the months of May & June. The treatments T₁, T₂, T₃, T₄, T₅, T₆, T₇ and T₈ were significant compared control (T₀). The results indicated that possibility to use Mentha and vitamin C in commercial broiler diets to enhance performance of broilers chicks during summer months.

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