



Effect of Supplementation of Cinnamon Powder on Growth Performance in Broiler Chickens

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Abstract

Broilers are proving a major source of income in poultry industries. The main field in broiler research in present days is to find out ways to enhance their growth. The present study involves feeding of ration including cinnamon to varying degrees to broiler birds and observing their growth performance. A total number of 160-day-old broiler chickens were taken and divided into 4 groups with 2 replicate groups of 20 broiler chickens each. These birds were kept for 35 days under study. It was found that birds supplemented with 0.5% and 1% cinnamon level significantly enhanced the body weight as compared to control group. Birds with 1% supplementation of cinnamon powder had the best FCR.

Keywords: Broiler, Cinnamon, Growth Performance

Introduction

The main field in broiler research in present days is to find out ways to enhance their growth. Many different compounds have been chosen for research. In this study, cinnamon has been administered. Cinnamon has some antioxidant and anti-inflammatory properties and also it acts as an appetite and digestive stimulant (Suganya *et al.*, 2014). This has inhibitory properties against *Aspergillus flavus* (Montes-Belmont and Carvajal, 1998). The essential oils present in cinnamon are seen to improve digestibility of nutrients in chicken (Hernandez *et al.*, 2004). Chowlu *et al.* (2018) observed that the use of cinnamon in diet of broiler chicken at various level has positive impact on the performance in terms of body weight gain, feed intake, FCR and on blood profile. Feeding of Fish silage at 5% level proves to be economical for growth of broiler Japanese quail (Mohanty *et al.*, 2020). Aksit *et al.* (2006) observed that cinnamon improves the microbial carcass hygiene and the preservation quality, in relation with their antimicrobial and antioxidant properties.

Materials and Methods

A total number of 160-day-old broiler chickens were taken and divided into 4 groups with 2 replicate groups of 20 broiler chickens each. These birds were kept for 35 days. The experimental design is shown in Table 1. The chickens were weighed group wise by top pan electric weighing balance nearest to 1 g accuracy in each week up to the end of 5th week were recorded. All the statistical analysis was done by using IBM SPSS 22.

Table 1: Experimental design of different treatment groups

Groups	Dietary Treatment
T1	Basal diet
T2	Basal diet+0.5% cinnamon powder
T3	Basal diet+1% cinnamon powder
T4	Basal diet+2% cinnamon powder

Results and Discussion

The effect of feeding different levels of cinnamon powder on the body weight of the experimental birds is presented in Table 2.

Table 2: Average weekly body weight (g) of the experimental broiler birds under different dietary treatments

Age	T ₁	T ₂ (0.5%)	T ₃ (1.0%)	T ₄ (2.0%)
0 day	42.50 ± 1.58	43.00 ± 1.32	43.50 ± 1.21	42.50 ± 1.27
7 th day	134.68 ^a ± 5.27	142.45 ^a ± 6.55	138.79 ^a ± 5.91	155.00 ^b ± 7.01
14 th day	414.00 ^a ± 11.32	462.50 ^b ± 14.37	438.00 ^b ± 16.66	404.00 ^a ± 14.40
21 st day	843.50 ^a ± 21.36	909.50 ^b ± 24.52	962.00 ^c ± 19.64	868.35 ^a ± 22.89
28 th day	1379.00 ^b ± 25.24	1464.00 ^c ± 27.68	1576.50 ^d ± 31.57	1317.79 ^a ± 29.73
35 th day	2038.77 ^a ± 34.27	2109.33 ^b ± 41.61	2214.68 ^c ± 46.18	1981.23 ^a ± 42.52

Means bearing different superscripts differ significantly along the rows

There was no significant variation ($p > 0.05$) in the mean day-old body weight. The day-old body weight ranged from 42.50 ± 1.58 g (T₁) to 43.00 ± 1.32 g in (T₃). On 7th day, T₄ showed the highest value i.e. 155.00 ± 7.01 and on 14th day, T₂ (462.50 ± 14.37) showed the highest body weight which was comparable to the group T₃. On 21st, 28th and 35th day, birds of the treatment group T₃ showed the highest body weight i.e. 962.00 ± 19.64, 1576.50 ± 31.57 and 2214.68 ± 46.18 respectively. Park (2008) reported higher BW for broilers fed diet containing 3% cinnamon powder compared to the control group, which supports the present findings although the levels studied in the present study were much lower i.e. 0.5 to 1.5%. The cumulative body weight gains of the experimental birds under different dietary treatments have been depicted in the Table 3.

Table 3: Average cumulative body weight gain (g) of the experimental birds under different dietary treatments

Week	T ₁	T ₂	T ₃	T ₄
0-1	92.18 ^a ± 4.13	99.45 ^a ± 2.35	95.29 ^a ± 3.66	112.5 ^b ± 3.28
0-2	371.5 ^a ± 12.21	419.5 ^b ± 11.98	394.5 ^{ab} ± 16.27	361.5 ^a ± 14.94
0-3	801.00 ^a ± 21.81	866.50 ^{ab} ± 26.67	918.50 ^b ± 31.11	825.85 ^a ± 22.03
0-4	1336.50 ^a ± 35.37	1421.00 ^b ± 29.32	1533.00 ^c ± 28.93	1275.29 ^a ± 32.07
0-5	1996.27 ^{ab} ± 31.26	2066.33 ^b ± 34.36	2171.18 ^c ± 41.94	1938.73 ^a ± 33.18

Means bearing different superscripts differ significantly along the rows

During the third and fourth week of experiment, birds from T₃ group showed statistically higher body weight gain (524.00 ± 16.08 g and 614.50 ± 16.99 g, respectively) than rest three treatment groups. In the fourth week, a statistically higher (P>0.05) body weight gain was observed in the birds from T₁ and T₂ groups as compared to T₄. During the final week, no statistically significant difference was observed among all the groups although the numerical observation was higher in group T₄ (663.44 ± 16.67 g). Chang *et al.* (2001); Park (2008) also reported that cinnamon extract supplementation had significantly higher daily gain. The cumulative body weight gains of the experimental birds under different dietary treatments have been depicted in the Table 4.

Table 4: Average cumulative body weight gain (g) of the experimental birds under different dietary treatments

Week	T ₁	T ₂	T ₃	T ₄
0-1	92.18 ^a ± 4.13	99.45 ^a ± 2.35	95.29 ^a ± 3.66	112.5 ^b ± 3.28
0-2	371.5 ^a ± 12.21	419.5 ^b ± 11.98	394.5 ^{ab} ± 16.27	361.5 ^a ± 14.94
0-3	801.00 ^a ± 21.81	866.50 ^{ab} ± 26.67	918.50 ^b ± 31.11	825.85 ^a ± 22.03
0-4	1336.50 ^a ± 35.37	1421.00 ^b ± 29.32	1533.00 ^c ± 28.93	1275.29 ^a ± 32.07
0-5	1996.27 ^{ab} ± 31.26	2066.33 ^b ± 34.36	2171.18 ^c ± 41.94	1938.73 ^a ± 33.18

Means bearing different superscripts differ significantly along the rows

At the end of 1st week, in group T₄ (112.5^b ± 3.28 g) maximum body weight was observed. Rest two treatment groups along with the control showed no difference among them. For the rest of the period, T₃ showed the maximum body weight gain each week i.e. 394.5^{ab} ± 16.27, 918.50^b ± 31.11, 1533.00^c ± 28.93 and 2171.18^c ± 41.94 respectively in subsequent weeks.

The effect of supplementation of cinnamon powder on the weekly feed intake of the experimental birds under different treatment groups has been presented in Table 5. Among the birds, the treatment group T₄ (336.35^b ± 16.72 g) showed the maximum feed intake during the 1st week, which was not comparable to the group T₁ and T₃ but found to be similar to the group T₂ (311.96^{ab} ± 11.66 g). In 2nd and 3rd week, T₂ and T₃ showed highest value of feed intake. In 4th week, T₃ (1094.06^c ± 25.91 g) showed maximum feed intake followed by T₂. During the 5th week, the control group T₁ (1343.49^c ± 42.67 g) showed the highest feed intake followed by T₄ (1227.72^b ± 37.44 g) and rest two groups were comparable to each other. Safa-Eltazi (2014) reported that dietary inclusion of cinnamon at 5% had significantly (P<0.05) higher body weight gain, feed intake and best feed conversion ratio.

Table 5: Average weekly feed intake (g) of the experimental broiler birds under different dietary treatments

Week	T ₁	T ₂	T ₃	T ₄
1 st week	297.64 ^a ± 14.34	311.96 ^{ab} ± 11.66	309.50 ^a ± 13.01	336.35 ^b ± 16.72
2 nd week	584.17 ^{ab} ± 22.38	677.78 ^c ± 31.37	592.77 ^b ± 28.85	516.09 ^a ± 33.55
3 rd week	737.70 ^a ± 29.71	838.34 ^b ± 33.74	983.24 ^c ± 31.68	901.62 ^b ± 28.08
4 th week	890.26 ^a ± 41.64	997.42 ^b ± 34.52	1094.06 ^c ± 25.91	841.97 ^a ± 29.6
5 th week	1343.49 ^c ± 42.67	1055.64 ^{ab} ± 39.92	984.69 ^a ± 28.67	1227.72 ^b ± 37.44

Means bearing different superscripts differ significantly along the rows

Cumulative feed intake of the experimental birds after supplementation of cinnamon powder at different levels is illustrated in Table 6.

Table 6: Cumulative feed intake (g) of the experimental broiler birds under different dietary treatments

Week	T ₁	T ₂	T ₃	T ₄
0-1	297.64 ± 6.32	311.96 ± 7.58	309.50 ± 7.04	336.35 ± 9.35
0-2	881.82 ^a ± 16.37	989.75 ^b ± 21.69	902.28 ^{ab} ± 17.45	852.44 ^a ± 19.28
0-3	1619.52 ± 22.65	1828.09 ± 31.94	1885.52 ± 28.91	1754.06 ± 26.76
0-4	2509.78 ± 39.88	2825.52 ± 32.64	2979.58 ± 35.75	2596.04 ^b ± 41.31
0-5	3853.27 ^a ± 42.34	3881.16 ^{ab} ± 39.76	3964.27 ^b ± 46.54	3823.77 ^a ± 51.96

Means bearing different superscripts differ significantly along the rows

Up to second week of the experimentation, cumulative feed intake was significantly higher ($P > 0.05$) in T₂ birds (989.75 ± 21.69 g), as compared to T₁ (881.82 ± 16.37 g) and T₄ (852.44 ± 19.28), but comparable to T₃ (902.28 ± 17.45 g). The cumulative feed intake up to 5th week showed significantly maximum intake by the T₃ group birds (3964.27 ± 46.54 g) with respect to experimental groups T₁ (3853.27 ± 42.34 g) and T₄ (3823.77 ± 51.96 g) and was found comparable to the group T₂ (3881.16 ± 39.76).

Cumulative FCR of the experimental birds in response to the supplementation of cinnamon powder at different level of inclusion has been depicted in Table VII. Up to fourth week, FCR did not vary significantly among all the treatment groups, whereas at the end of 5th week, FCR of T₃ birds was found to be significantly superior compared to T₄ birds (1.79^a ± 0.04 vs. 1.93^b ± 0.01). The performance of the birds under T₁ and T₂ birds did not vary statistically. However, performance of groups T₂ and T₃ were comparable. Al-Kassie (2009) study showed that the supplementation of 200 ppm oil extract derived from thyme and cinnamon in broiler diets significantly improved the live weight gain and feed conversion ratio during a growing period of 6 weeks. Toghyani *et al.* (2011) found no difference in feed intake and FCR of broilers after the dietary incorporation of cinnamon powder.

Table 7: Cumulative Feed Conversion Ratio (FCR) of the experimental broiler birds under different dietary treatments

Week	T ₁	T ₂	T ₃	T ₄
0-1	2.21 ± 0.02	2.19 ± 0.04	2.23 ± 0.03	2.17 ± 0.02
0-2	2.13 ± 0.01	2.14 ± 0.05	2.06 ± 0.05	2.11 ± 0.04
0-3	1.92 ± 0.03	2.01 ± 0.03	1.96 ± 0.02	2.02 ± 0.03
0-4	1.82 ± 0.04	1.93 ± 0.02	1.89 ± 0.01	1.97 ± 0.04
0-5	1.89 ^{ab} ± 0.02	1.84 ^a ± 0.03	1.79 ^a ± 0.04	1.93 ^b ± 0.01

Means bearing different superscripts differ significantly along the rows

Conclusion

Thus, it was found that birds supplemented with 0.5% and 1% cinnamon level significantly enhanced the body weight as compared to control group. Birds with 1% supplementation of cinnamon powder had the best FCR. This study may be taken as a reference for adding cinnamon in the feed of broilers.

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Conflict of Interests

There is no conflict of interest.

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