

Effects of Turmeric and Cinnamon Powder on Performance and Immune Traits of Broiler Chickens

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ABSTRACT

This experience was done to impact assessment of turmeric and cinnamon powder added of a commercial broiler fed on the performance and immune response. Three dietary processing (50 chicks per treatment) with (2) duplicate (25chicks perduplicate) of broiler strain (Cobb) at one day old, G1 (as control group) chicks fed on basal nutrition without any supplement. however, G2 and G3 nutrition on feed supplemented with 0.5 and 0.5% *cinnamon powder* and *turmeric powder* respectively to the end of the study (35 days) to examine the broiler implementation and immune function. The results of experiment that the two treated groups had a useful effect on the antibody titer against (NDV), (IB), bursa index and spleen index. The rise levels of Immunostimulatory were theorize as the signal of anti-virus action of turmeric and Cinnamon. on the other hand. The results showed significant ($p<0.05$) advance of performance in treatment groups compared with control group. finally, *cinnamon powder* and *turmeric powder* complement in broiler feeds was advantageous to chickens performance and immune status.

Keywords: *cinnamon powder* and *turmeric powder*, bursa index, spleen index.

INTRODUCTION

With increase population and rise demand of white meat without the red for easy to digest and dislike the high nutritional value reliance on this demands, there has been prompting researchers and academics to experience multiple types of growth promoters, the top of this catalysts are plant particularly after the ban on the use of antibiotics as catalysts for growth¹. The turmeric powder and cinnamon are the most important medical plant for this purpose and have been used for decades, That's possess these plants properties as antioxidants and anti-microbial and organize the activity of the intestines in addition to the palatable food, reflecting the positive impact on growth.

Sri Lanka is the major habitat of cinnamon, where cinnamon powder substance cynamaldehyde and considered to be of a positive impact on the good qualities of productivity of the animal in general and, in particular, poultry. The turmeric powder, which is the final product after cleaning, drying and grinding the yellow edged grain turmeric plant which is one of medicinal plants from Zingiberaceae family. And containing a substance Alrhzumi^{3,4}. Recent studies show edthes powder, cinnamaldehyde alone or in combination with other substance have a broad array of good effects in poultry. Several of those beneficial include improve feed intake⁵, increase performance and feed efficiency^{5,6,7}, Improve pancreatic and intestinal lipase efficiency⁸, improve breast meat yield^{5,6,7} safeguard against pathogens such as *Pseudomonas aeruginosa*, *Escherichia coli*, *Staphylococcus aureus*, *Enterococcus faecalis*, *Salmonella*

sp, *Staphylococcus epidermis*, *Helicobacter pylori* and *Parahemolyticus*^{9,10}.

MATERIALS & METHODS

One hundred and fifteen at one day-old of broilers birds (Cobb) were weighed and randomly divided into 3 treated groups of 50 chicks, each group was subdivided to 2 replicates of 25 chicks per replicate. Each replicate was three square meters with one tube feeder and one drinker. The one group (Control) was fed daily on feed without anything as a control group, group (Turmeric) were fed daily on diet with added 0.5% of *cinnamon powder* and the third group (Cinnamon) were fed on diet with 0.5% *turmeric powder*.

Chicks were reared in an environmentally controlled room and had free access to diet and water. Temperature

Ingredient	%
Soybean meal	30
Animal protein	5
Corn	32.5
Wheat	30
Di calcium PO ₄	0.8
Premixes	0.5
DL- Methionine	0.1
lysine	0.1
Vegetable Oil	1
Total weight (kg)	100
Total of crude protein (%)	21.5
Total of metabolizable energy (kcal/kg)	3020

Table 1: Effect of turmeric powder and cinnamon supplement to diet on body weight (gm) (means \pm SE).

Groups	Control	Turmeric	Cinnamon
Age by weak			
1st week	150.95 \pm 0.63 B	161.72 \pm 0.57 A	164.35 \pm 0.51 A
2 nd week	380.90 \pm 0.69 B	397.70 \pm 0.75 A	400.95 \pm 0.76 A
3 rd week	810.15 \pm 1.24 B	821.50 \pm 1.52 B	846.15 \pm 2.20 A
4 th week	1281.97 \pm 2.25 B	1327.88 \pm 2.17 B	1375.35 \pm 2.85 A
5 th week	1882.70 \pm 2.98 C	1943.57 \pm 2.39 B	2060.15 \pm 2.24 A

Different letters in same raw denoted that significant differences between treatments at a level ($p \leq 0.05$).

Table 2: Effect of turmeric powder and cinnamon supplement to diet on body weight gain (gm). (means \pm SE).

Groups	Control	Turmeric	Cinnamon
Age by weak			
1st week	125.90 \pm 0.4 B	128.72 \pm 0.55 A	129.87 \pm 0.57 A
2 nd week	239.95 \pm 0.69 B	238.67 \pm 0.78 B	249.65 \pm 0.89 A
3 rd week	438.22 \pm 1.35 B	446.42 \pm 2.81 B	449.20 \pm 1.87 A
4 th week	435.55 \pm 2.32 C	499.98 \pm 2.24 B	527.30 \pm 2.28 A
5 th week	629.91 \pm 3.74 C	648.13 \pm 2.85 B	659.99 \pm 2.48 A

Different letters in same raw denoted that significant differences between treatments at a level ($p \leq 0.05$).

Table 3: Effect of turmeric powder and cinnamon supplement to diet on feed consumption (gm). (means \pm SE).

Groups	Control	Turmeric	Cinnamon
Age by weak			
1st week	153.80 \pm 0.41	149.0 \pm 0.61	151.0 \pm 1.00
2 nd week	352.10 \pm 1.35	349.80 \pm 0.97	339.90 \pm 1.27
3 rd week	661.2 \pm 3.31 A	637.80 \pm 1.12 B	631.70 \pm 0.68 B
4 th week	797.30 \pm 1.57 A	783.0 \pm 1.99 B	781.40 \pm 1.57 B
5 th week	1151.0 \pm 1.85 A	1102.0 \pm 2.00 B	1118.50 \pm 2.40 B

Different letters in same raw denoted that significant differences between treatments at a level ($p \leq 0.05$).

Table 4: Effect of turmeric powder and cinnamon supplement to diet on feed conversion ratio. (means \pm SE).

Groups	Control	Turmeric	Cinnamon
Age by weak			
1st week	1.28 \pm 0.003 A	1.23 \pm 0.005 B	1.24 \pm 0.006 B
2 nd week	1.53 \pm 0.006 A	1.45 \pm 0.005 B	1.41 \pm 0.006 B
3 rd week	1.56 \pm 0.001 A	1.49 \pm 0.002 B	1.47 \pm 0.008 B
4 th week	1.79 \pm 0.004 A	1.61 \pm 0.004 B	1.59 \pm 0.007 B
5 th week	1.83 \pm 0.004 A	1.77 \pm 0.003 B	1.75 \pm 0.004 B

Different letters in same raw denoted that significant differences between treatments at a level ($p \leq 0.05$).

Table 5: Effect of turmeric powder and cinnamon supplement to diet on ELIZA Abs titer against ND virus 35 days old chicks. (means \pm SE).

Groups	Control	Turmeric	Cinnamon
Age of chicks			
35	3120.9 \pm 18.57 B	3483.7 \pm 17.79 A	3516.9 \pm 24.74 A

Different letters in same raw denoted that significant differences between treatments at a level ($P \leq 0.05$).

was maintained at 32°C for the first two days of old and then was gradually reduced to 22°C (at the rate of 2°C per week), which was kept at this temperature to the end of the experiment. Light was provided continuously. At the end period of the experimental (42 d of age) 5 birds from each replicate (10 birds per treatment) were randomly selected, weighed, and slaughtered by cervical

dislocation¹¹. Abdominal cavity was opened and spleen and bursa of Fabricius were dissected and weighed. Blood samples collected from heart in a test tube even anticoagulant from ten broilers of each treatment randomly. Allowed to the blood was a clot and centrifuged for 15 minutes at 3000 rpm to obtain on

Table 6: Effect of turmeric powder and cinnamon supplement to diet on ELIZA Abs titer against IBD virus 35 days old chicks. (means \pm SE).

Groups	Control	Turmeric	Cinnamon
Age of chicks			
35 days	9788.75 \pm 1594.7 B	12576.5 \pm 533.8 A	12743.50 \pm 275.5 A

Different letters in same raw denoted that significant differences between treatments at a level ($p \leq 0.05$).

Table 7: Effect of turmeric powder and cinnamon supplement to diet on bursa index (gm) 35 days old chicks. (means \pm SE).

Groups	Control	Turmeric	Cinnamon
Age of chicks			
35 days	0.0376 \pm 0.00076 B	0.0497 \pm 0.00085 A	0.0519 \pm 0.00098 A

Different letters in same raw denoted that significant differences between treatments at a level ($p \leq 0.05$).

Table 8: Effect of turmeric powder and cinnamon supplement to diet on spleen index (gm) 35 days old chicks. (means \pm SE).

Groups	Control	Turmeric	Cinnamon
Age of chicks			
35 days	1.13 \pm 0.042 B	1.66 \pm 0.063 A	1.54 \pm 0.076 A

Different letters in same raw denoted that significant differences between treatments at a level ($p \leq 0.05$).

serum which are stored in a deep freeze (-20°C)¹². Feed intake, body weight and body weight gain were recorded weekly and feed conversion ratio was determined. Data were analyzed for the treatment of each groups using analysis of variance (ANOVA). Least significant difference (LSD) among different groups means at 5% level was applied¹³.

RESULTS AND DISCUSSION

The results for body weight (BW), body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR) for the experiment are shown in Table (1,2,3 and 4). The performance parameters in general are improved in chicks fed diet containing turmeric powder (*Curcuma longa*) and cinnamon powder comparatively with chicks in control group.

During all periods of experiment (1-5 weeks old) results showed significant ($P < 0.05$) increased in means live body weights among the treated groups compared with control group (2060) and (1943) followed by (1882) in control.

On the other hand, the body weight gain a significant ($P < 0.05$) increased in group of Cinnamon compared with turmeric and control groups. While the feed intake and feed conversion ratio showed significant ($P < 0.05$) increased in treated groups compared with control group.

As well as the Cinnamon group recorded non-significant superior in performance parameters compared with control group.

The significant increase in performance parameters can be due to optimum antioxidant efficiency of Turmeric (*Curcuma longa*) and Cinnamon at the level of 0.5% that catalyze protein synthesis by chicken enzymatic system.

In general, performance parameters of this study are contradictory to those of^{5,15} who found improved performance in broilers fed diets supplemented with Cinnamon⁴. also observed less feed consumption in

chick broilers at 5g Turmeric (*Curcuma longa*) per kg of feed.

Curcumin, the main antioxidant ingredient of turmeric, is accountable for its anticarcinogenic and antimutagenic activity¹⁶. Recently, Emadi, M., and H. Kermanshahi¹⁷ fed broiler chicks turmeric powder (0.25, 0.5, 0.75%) from hatch to 49d and concluded that turmeric might have some favorable effects on liver enzymes by decreasing alanine amino transferase and alkaline phosphatase activities that directly or indirectly reflect a healthier liver status in the broiler chicks.

Beneficial effects of turmeric and Cinnamon have been reported to be associated with stimulation of bile production in the liver of broiler chickens¹⁸. The increase in production and secretion of bile salts in human due to turmeric consumption has also been reported^{19,20} mention advance in the utilization of apparent metabolizable energy due to supplementation of broiler feed with curcumin. Furthermore, enhanced activities of trypsin and amylase in pancreas and small intestine of broiler chickens fed diets supplemented with essential oils, has been reported^{21,22}. Therefore, the improvement in the performance parameters of the birds in my study can be partly attributed to the effects of turmeric and Cinnamon on bile and digestive enzymes production and secretion and consequently better digestion and absorption of the dietary nutrients.

The results of immunity parameters to this experiment recorded significant ($P < 0.05$) increased in Abs titer against ND virus, Abs titer against IBD virus, bursa index and spleen index in groups of turmeric and Cinnamon compared with control group Table (5, 6, 7 and 8).

Immunostimulatory effects of turmeric and Cinnamon have been demonstrated²³. Kumari P. et al. reported an increase in antibody titer to NDV and IBD vaccines in broilers due to administration of turmeric into the diet.

Supplementation of the broilers diets with turmeric increased serum Zn concentration which can be related to increased antioxidant defense²⁴. The increase in CD4 T-lymphocytes as well as B-lymphocytes in mice consuming 1 gram curcumin per kilogram of the diet, has been reported²⁵.

The evaluations of digestive stress in this study has been causes identified as in immunity parameters. In general the significant improvement of immunity parameters in this study are confirmed by²⁶⁻²⁸. Al-Sultan SI³ where it has noted there was improvement in immunity in their experiments.

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