



The effects of cinnamon powder feeding on some blood aspects and performance of broiler chicken

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Abstract

This study was conducted to determine the effect of cinnamon powder on live weight gain, feed intake and feed conversion ratio, and some blood constituents. Three hundred one day-old broiler chickens (Ross308) were distributed into 15 pens with 20 chickens each, into five equal groups, comprising 3 replicates per treatment. The experimental treatments were fed as follows : a negative control diet without cinnamon T1 , 250 ppm of cinnamon T2 , 500 ppm of cinnamon T3 , 750 ppm of cinnamon T4 , and 1000 ppm of cinnamon T5 , and the feeding were carried out for 49 days.

The results showed that chickens fed with cinnamon powder (T2,T3,T4,T5) had significantly higher ($p \leq 0.05$) , live body weight gain , feed intake compared with control group (T1), but there were no significant between T1 and all treatments except T5 on feed conversion ratio. Moreover the chickens fed with cinnamon powder had significant ($p \leq 0.05$) reducing serum glucose, cholesterol and triglyceride. In conclusion, cinnamon powder could be considered as a potential natural growth promoter for poultry due to the effect on some blood metabolites and broiler performance.

Keywords: Broiler, Cinnamon, Glucose, Cholesterol, Triglyceride.

تأثير مستويات مختلفة من مسحوق لحاء القرفة على اداء وبعض الصفات الدمية لفروج اللحم

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الخلاصة:

تهدف هذه الدراسة الى تعيين تأثير مسحوق لحاء القرفة على الوزن الحي , كمية العلف المستهلكة ونسبة الهضم مع بعض صفات الدم . وزعت 300 فروج لحم نوع (ROSS308) عمر يوم واحد وزعت في 15 قفص بواقع 20 فروج للقفص الواحد و 5 مجموعات بثلاث مكررات للمجموعة الواحدة . وكما يلي : T1 عليقة بدون اضافة لحاء القرفة , T2

عليقة اعتيادية مضاف اليها 250 ppm , T3 عليقة اعتيادية مضاف اليها 500 ppm , T4 عليقة اعتيادية مضاف اليها 750 ppm و T5 عليقة اعتيادية مضاف اليها 1000 ppm مسحوق لحاء القرفة . وقد استمرت التجربة لمدة 49 يوم .

اوضحت النتائج وجود فروقات معنوية ($p \leq 0.05$) بين المجموعات T5, T4, T3, T2 ومجموعة السيطرة T1 في الوزن الحي , كمية العلف المستهلك وعدم وجود فروقات معنوية بين مجموعة السيطرة وبقية المعاملات باستثناء المجموعة T5 في معامل التحويل الغذائي .

كذلك وجد ان هناك فروقات معنوية منخفضة بمستوى ($p \leq 0.05$) لسكر الدم والكوليسترول والدهون الثلاثية بين مجموعة السيطرة وبقية المجموعات المضاف اليها مسحوق لحاء القرفة .

نستنتج بان مسحوق لحاء القرفة يصلح ان يكون معزز نمو للدواجن وله تأثير في الايض الحيوي وكفاءة التحويل الغذائي لدجاج .

Introduction:

Wild plant and herbs have been used throughout history as source of remedy for various ailments and phytogetic feed additives in animal feeding in order to improve livestock performance, especially for use in poultry. One of the oldest medicinal plants is cinnamon. The genus *Cinnamomum* comprises approximately 250 species that are widely distributed in China, India and Australia (1).

Ground cinnamon bark and his oil extract can suppress pathogenic microbes and reduces the number of *Pseudomonas fluoresces* and *Lactobacillus* and *Staphylococcus*, *Bacillus* (2,3),

Many studies involving live birds showed that blends of the primary components of the cinnamon oil could be used to control *Clostridium perfringens*, the bacterium that causes necrotic enteritis in broilers (4). Cinnamon bark has a wide range of activities such as stimulation of feed intake and endogenous secretions, and also has positive effects on blood metabolites (5).

Insulin Potentiating Factor (IPF) which was isolated from Cinnamon bark has lowered plasma glucose levels by increasing the activity of insulin in glucose metabolism (6). Also, Khan (7) compared fasting serum glucose

levels in 60 type -2 diabetic subjects. Cinnamon had a statistically significant effect in decreasing fasting serum glucose level (from a mean of 326 to 175 mg/dl).

Fat and cholesterol reduction of processed egg yolk has been a primary concern of the egg industry (8). Cholesterol content in the eggs is influenced by genetic factors, diet composition, lay intensity, layer age and medical treatment (9).

The effect of ground cinnamon on performance of broilers was studied by Al-Kassie and Jameel (10), who found it affected live weight gain and improved bird health, as well as other performance traits, as feed conversion ratio and feed intake.

Materials and Methods

Three hundred day -old mixed sexed broiler chicks (Ross308) were used in the study. Chicks were weighed and the average of weight was recorded as day-old weight. They were assigned into 5 treatment groups. Each group was divided into 3 equal replicates of 20 chicks per replicate, were fed for 49 days. The five dietary treatments used in this study were as follows: T1 basal diet (control), T2: basal diet + 250 ppm of cinnamon powder, T3: basal diet + 500 ppm of cinnamon powder, T4: basal diet + 750 ppm of cinnamon powder, T5: basal diet + 1000 ppm of cinnamon powder. All diets were made

up with essential ingredients such that they supplied bird nutritional requirements as recommended by National Research Council.

Sampling and measurements

Bird's body weight and feed intake were weekly recorded to calculate weight gain and feed conversion in the different periods. Blood glucose level was measured weekly (two birds from each pen). At the end of experiment, two birds in each pen were bled from a punctured median metatarsal vein. Ten milliliter of blood were aspirated from each bird then coagulated to sera for blood chemistry measurements. Plasma cholesterol, triglyceride, the measurements were made at 49 days of age, using appropriate commercial laboratory kits with spectrophotometer.

Data were analyzed by using General Linear Model procedure of SAS (11). Duncan's multiple range test was used to detect the differences ($p \leq 0.05$) among different group means (12)

Results and Discussions:

The results related to the effects of the dietary addition of different level of cinnamon powder on body weight gain are presented in Table 1, had significant effect ($p \leq 0.05$) between T1 and the other treatments in all periods. The highest body weight gain happen with the broilers of T5 (2626 g) compared with T1 (2482g). The results showed no significant effect ($p \leq 0.05$) on feed intake between T1 and the other treatment in the 21-42 days period (3156, 3162, 3170, 3168, 3164 g), May there were significant in the 1-49 days period (5340, 5372, 5424, 5450, 5448 g). The results showed no significant effect on the feed conversion ratio for all treatments in

21-42 days period, may there were significant effect ($p \leq 0.05$) in 1-49 days between T1 and T5 only.

Results indicated that cinnamon powder at its highest level during all periods T5 had its highest body weight gain, feed intake, these results could be related to changes that happened in blood metabolites. The body weight gain in T5 might be due to increase in feed intake, and decrease of feed conversion ratio. The increase in feed intake might be due to increase appetite for the broilers.

Blood parameters

The effects of different level of cinnamon on blood biochemistry parameters (glucose, cholesterol, triglycerides) of broilers are presented in Table 2. Cinnamon powder supplementation had significantly ($p \leq 0.05$) lower glucose, cholesterol and triglyceride levels, compared with the control group ($p \leq 0.05$). These observations are correlated with the data published by some authors (13, 14, 15, 16, 17, and 18). Also, Khan (7) showed that cinnamon had hypoglycemic and hypolipidemic effects in type-2 diabetic subjects.

The results in this study conducted by Kim (19), in which supplementation of the diet of diabetic mice with 200 mg /kg of cinnamon powder decreased blood glucose, total cholesterol and triglyceride levels. In contrast with mammals, birds, glucagon plays a major role in directing the distribution of nutrients, and insulin has a secondary role (20).

In present study, supplementation of broilers diet T5 with 1000 ppm, (0.02%) of cinnamon powder significantly ($p \leq 0.05$) decreased blood glucose, cholesterol and triglycerides.

Table 1- Growth performance in broiler chickens fed the experimental diets:

Parameters	T1	T2	T3	T4	T5	LSD
Body weight (gain g/bird)						
1 - 21 days	682	702	714	716	732	10.334
21 - 42 days	1384	1392	1398	1398	1424	21.972
42 - 49 days	416	428	448	468	470	10.291
1 -49 days	2482	2522	2560	2582	2626	20.127
Feed intake, (g/bird)						
1 -21 days	1128	1132	1134	1140	1146	11.477
21 - 42 days	3156	3162	3170	3168	3164	10.483
42 - 49 days	1056	1078	1120	1142	1138	12.455
1 - 49 days	5340	5372	5424	5450	5448	10.291
Feed conversion ratio						
1 - 21 days	1.65	1.61	1.58	1.59	1.56	0.07
21 - 42 days	2.28	2.27	2.26	2.26	2.22	0.0807
42 - 49 days	2.54	2.52	2.50	2.44	2.42	0.0759
1 - 49 days	2.15	2.13	2.12	2.11	2.07	0.0646

Table 2 – Blood parameters in broiler chickens fed the experimental diets.

Parameters	T1	T2	T3	T4	T5	LSD
Glucose (mg/dl)						
Days 7	281	240	230	236	210	7.3224
Days 21	246	216	210	210	190	4.5348
Days 42	236	210	208	210	196	5.8299
Days 49	238	208	210	212	200	6.1426
Cholesterol (mg/dl)						
Days 49	125	105	104	106	102	5.0373
Triglyceride (mg/dl)						
Days 49	120	98	94	88	82	3.8161

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