



# THE INFLUENCE OF CINNAMON INTAKE ON SOME PRODUCTION PERFORMANCE AND BLOOD PICTURE PARAMETER OF BROILER CHICKENS

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## Abstract

The study was designed to investigate the positive effects that may result from the use of cinnamon on some production performance and blood picture parameter of broiler chickens. Fifty (Ross breed) birds one day old were been grouped randomly into two groups: control group and treatment group. Chicks were housing and feeding for 42 days. Results were show a significant ( $P < 0.05$ ) weekly increase of body weight of treatment group (2587.36g) respectively than the control group (2412.20g), and feed intake (4693.01g) compared with control group (4578.83g). Also a significant increase in number of red blood cells ( $3.17 \times 10^6/\text{ml}^3$ ) and the (PCV) (9.86%), the concentration of Hb (10.05 g/100 ml of blood) than the control group and there is significant increase in the number of white blood cells, and no significant effect in (H / L Ratio). So can give cinnamon to increase productivity qualities ,immunity and blood for poultry.

**Key words:** cinnamon, H / L Ratio, broiler.

## Introduction

Plants and medicinal herbs have been used since ancient times in the treatment of diseases and improvement of health status in humans and animals. In the field of poultry, plants and parts were used to treat various diseases and to improve health status and to increase poultry production (Park 2013). Cinnamon, the inner bark of a tropical evergreen tree has two main types, Ceylon cinnamon (*Cinnamomum zeylanicum* Blume) and Chinese Cassia (*Cinnamomum aromaticum* Ness) and which when dried, rolls into a tubular form known as a quill. Cinnamon is available in either its whole quill form (cinnamon sticks) or as ground powder (Shen *et al.*, 2010). Cinnamon is a spice obtained from the bark of an evergreen tree belonging to the Lauraceae family. Major constituents in cinnamon include: eugenol, *cinnamaldehyde*, terpinene, carvacrol, linalool,  $\alpha$ -pinene, safrole, benzyl benzoate, and coumarin (Tabak *et al.*, 1999) cinnamon is considered a remedy for digestive, respiratory, and gynecological ailments. Recent studies emerging from western countries have shown many potentially beneficial health effects of cinnamon such as anti-inflammatory properties, anti-microbial activity, blood glucose control, reducing cardiovascular disease, boosting cognitive function, and reducing risk of colonic cancer

(Khan *et al.*, 2003). Studies have shown that cinnamon enhances glucose uptake by activating the insulin receptor kinase activity, and glycogen synthase activity (Cao *et al.*, 2007; Qin *et al.*, 2003).

The aim of this study was to investigate the effect of cinnamon food consumption, body weight, weight gain and some blood picture parameter of broiler chickens.

## Materials and methods

Fifty (Ross breed) one day old chicks were feed by special feeding program, grouped randomly into control group, treatment group, and housed for 42 days (1 September to 13 October, 2017), and measure some blood picture parameter and some productive performance. The chicks' foods and water were free, and housed in cages containing 25 chicks.

Chicks were weighting weekly throughout the study period. Live body weight and Body weight gain was calculated weekly (Al-Zubaidi, 1986). Blood samples were collected from wing vein from twelve chicks per group on age 42 days, using blood tube containing (EDTA) an anticoagulant for hematological tests. Packed Cell Volume (PCV) has been measured by heparinized capillary tubes were filled to 3/4 with blood (Archer, 1965). Red Blood Cells counts (RBC) using solution Natt

and Herrick and total white blood cells (TWBC), Differential Count were estimate according to the methods as reported by (Natt and Herrick .1952). Hemoglobin concentration (Hb) was determined by using Darbkin's reagent (Varley *et al.*, 1980).

The feeding program was the starter and a finisher diet (as below).

Ingredient	Starter (1-21) day	Finisher (22-42) day
Wheat	20	18.3
Yellow Corn	40.2	43.5
Soybean meal	27	23.4
Sunflower Oil	1.7	3.6
Calcium Phosphate	0.4	0.5
Protein Concentrate	10	10
Cinnamon	0.3	0.3
Nacl	0.4	0.4
Total	100	100

### Statistical Analysis

The obtained quantitative data were presented as (Mean  $\pm$  SE) in tables.

Data were carried out in a complete randomized design (CRD) using of SAS software (SAS, 2000). The significant differences among means were determined by using (ANOVA) tests and were compared at ( $P < 0.05$ ).

### Results

The feedintake of cinnamon in chickens group from the 2nd to the 6th week age were found significantly ( $P < 0.05$ ) higher than those of control group (Table 1). Table 2 show the body weight gain was higher in cinnamon group than those of control group. Accumulative body weight gains were calculated during (2-6) weeks. Table 3 The live body weight was enhanced, all chicks had a higher body weight and grew significantly ( $P < 0.05$ )

faster than those of control group. The effect of cinnamon addition on blood picture was show a significant ( $P < 0.05$ ) increase in (Hb), (PCV), total red blood cells count (TRBC) and total white blood cells count (TWBC) and no significant effect in (H / L Ratio) in compared to control group (Table 4).

### Discussion

The feed intake of chicks in cinnamon group was seen significantly ( $P < 0.05$ ) higher than those of control group from the 2nd week to the 6 week of age. Chicks that feeding cinnamon had a significant ( $P < 0.05$ ) higher body weight and grew faster than those of control group. Body weight gain of chicks feeding cinnamon were observed higher than those of control group. Accumulative body weight gains were calculated during (2-6) weeks. This increase in feed intake and Body weight may be due to the act of cinnamon on appetite. The presence of cinnzeylanin and cinnceylanol increase gastric secretions and explains the traditional use of cinnamon to stimulate the appetite (Aruna, 2005) and it may be due to cinnamon as they helps chicks gain weight faster by drawing nutrients from limited feed and still be delivered as quality meat.

The effect of cinnamon on blood (Hb), (PCV), and (TRBC) is, significant increase ( $P < 0.05$ ) in chicks as feeding with cinnamon compared to control group. According to the United Kingdom Prospective Study (UKPS), from 7.9% to 7% lowers the risk of macro- and micro-vascular disease significantly (UKPDS, 1998) thus, a better control of Hb, PCV, TRBC levels. In addition, in healthy-induced animals, cinnamon caused a very significant reduction in the total and LDL cholesterol levels. This cholesterol lowering effect of cinnamon together with its antioxidant properties (Mancini-Filho *et al.*, 1998) while also being effective as a supplement in

**Table 1:** The influence of cinnamon on feed intake (Mean  $\pm$ SE) of broiler chicks

groups	Feed intake (g\ bird)					
	Week 2	Week 3	Week 4	Week 5	Week 6	Week 2-6 Accumulative
Control	262.80 <sub>b</sub> $\pm$ 1.4	642.23 <sub>b</sub> $\pm$ 1.50	1101.51 <sub>b</sub> $\pm$ 2.52	1302.07 <sub>b</sub> $\pm$ 5.86	1269.73 <sub>b</sub> $\pm$ 9.27	4578.83 <sub>b</sub> $\pm$ 21.23
Treatments	279.18 <sub>a</sub> $\pm$ 2.29	658.80 <sub>a</sub> $\pm$ 2.30	1065.24 <sub>a</sub> $\pm$ 2.24	1313.32 <sub>a</sub> $\pm$ 5.83	1285.26 <sub>a</sub> $\pm$ 8.74	4693.01 <sub>a</sub> $\pm$ 20.66

**Table 2:** The influence of cinnamon on weight gain (Mean  $\pm$ SE) of broiler chicks

groups	Live body weight gain (g)					
	Week 2	Week 3	Week 4	Week 5	Week 6	Week 2-6 Accumulative
Control	185.11 <sub>b</sub> $\pm$ 4.46	410.81 <sub>b</sub> $\pm$ 5.75	540.89 <sub>b</sub> $\pm$ 1.81	677.03 <sub>b</sub> $\pm$ 3.10	611.91 <sub>b</sub> $\pm$ 2.80	2453.021 <sub>b</sub> $\pm$ 8.50
Treatments	207.35 <sub>a</sub> $\pm$ 2.28	441.01 <sub>a</sub> $\pm$ 11.64	602.91 <sub>a</sub> $\pm$ 4.51	708.05 <sub>a</sub> $\pm$ 1.76	627.83 <sub>a</sub> $\pm$ 1.56	2587.36 <sub>a</sub> $\pm$ 9.511

Different letters vertically indicate significant difference ( $P < 0.05$ ).

**Table 3:** The influence of cinnamon on live body weight (Mean  $\pm$ SE) of broiler chicks

groups	Live body weight (g)				
	Week 2	Week 3	Week 4	Week 5	Week 6
Control	336.20 <sub>b</sub> $\pm$ 4.41	765.11 <sub>b</sub> $\pm$ 10.40	1303.06 <sub>b</sub> $\pm$ 7.91	2001.08 <sub>b</sub> $\pm$ 5.75	2412.20 <sub>b</sub> $\pm$ 8.60
Treatments	358.41 <sub>a</sub> $\pm$ 2.20	815.41 <sub>a</sub> $\pm$ 11.31	1424.32 <sub>a</sub> $\pm$ 6.90	2119.33 <sub>a</sub> $\pm$ 8.61	26415.25 <sub>a</sub> $\pm$ 8.12

**Table 4:** The influence of cinnamon on blood picture (Mean  $\pm$ SE) of broiler chicks

groups	TRBC	Hb (g/100	TWBC	PCV%	(H/L Ratio)
	(N $\times$ 10 <sup>6</sup> /ml <sup>3</sup> )	ml blood)	(N $\times$ 10 <sup>3</sup> /ml <sup>3</sup> )		
Control	2.67 <sub>b</sub> $\pm$ 0.01	8.70 <sub>b</sub> $\pm$ 0.364	21.25 <sub>b</sub> $\pm$ 0.01	9.47 <sub>b</sub> $\pm$ 0.30	0.30 $\pm$ 0.02a
Treatments	3.17 <sub>a</sub> $\pm$ 0.05	10.05 <sub>a</sub> $\pm$ 0.11	23.23 <sub>a</sub> $\pm$ 0.21	9.86 <sub>a</sub> $\pm$ 0.410	0.31 $\pm$ 0.01a

patients with hyperlipidemia and cardiovascular diseases.. TWBC of chicks which feeding cinnamon was significantly increased as compared with control. The causes of this increased may be due to increase in immune cells (lymphocyte) the study refers that cinnamon polyphenol regulated immune function by affecting expression levels of genes that code for tristetraprolin (TTP), proinflammatory cytokines, and glucose transporter family proteins,. Because TTP down regulates, it has the potential for use in the prevention and treatment of inflammation-related diseases. (Cao *et al.*, 2008), cinnamon's has powerful effects on health and metabolism, The antioxidants in cinnamon have anti-inflammatory effects, which may help lower the risk of disease and some studies show that the antioxidants in it have potent anti-inflammatory activity (Mancini-Filho *et al.*, 1998).

Measuring the percentage of H/L cells is considered a global indicator of the real health situation as the high percentage indicates that the condition of stress and that the low proportion of evidence of the good health conditions of education and the absence of any stress factors for the bird (Abraham *et al.*, 2000).

In contrast, cinnamon has shown to contain a lesser content of coumarin (Ouattara *et al.*, 1997, Rychlik, 2008) and thus it may be possible that cinnamon could be used in higher doses without toxic effects for longer durations.

## Conclusion

From this results, we can give cinnamon in food to increase productivity qualities, immunity and blood for poultry.

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