EFFECT OF VARYING LEVELS OF *CINNAMOMUM CEYLON* POWDER ON GROWTH PERFORMANCE OF BROILER CHICKEN

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ABSTRACT
The effects of varying levels of Cinnamomum ceylon powder (CCP) dietary supplementation on growth performance of broiler chicken was conducted in this study. A basal diet divided into four portions designated diet 1 (control) and diets 2, 3, and 4 supplemented with 0.2, 0.4 and 0.6% (CCP), respectively. One hundred and twenty –eight chicks were randomly assigned to the four experimental diets (32 birds per treatment, 8 birds per replicate) using a Completely Randomized Design. At the finisher phase the highest final live- body weight of birds on 0.4% and 0.6% CCP supplemented diets were similar (P>0.05) but significantly (P<0.05) higher than birds on control diet and 0.2% CCP supplemented diet. The highest feed intake was recorded for birds on 0.4% CCP supplemented diet at 6215.18g while the least was recorded for birds on control diet at 5709.90g. Birds on 0.2% CCP supplemented diet had the lowest FCR. The CCP supplemented in this study increased the final live-weight of broiler chickens and improved the FCR especially birds on 0.2% CCP supplemented diet.
Keywords: *Cinnamomum Ceylon* powder, broiler chickens, growth performance, phytogenic supplements

INTRODUCTION

In an effort to lessen the influence of poultry products on human health (Leeson, 2008), some studies, organizations (WHO, 2014), and businesses are producing chickens fed diets devoid of or having less pharmaceutical drugs (EMG, 2017). In order to enhance feed potency and manage infections, antibiotics are utilized as growth promoters in veterinary medicine, agriculture, and animal diets (Gadde *et al*., 2017). On the other hand, multi-drug-resistant bacteria are known to proliferate in poultry and cattle fed antibiotics based diets (Han, 2020). Additionally, Schokker *et al*. (2017) found that using antibiotics on a bird's first day of life had a detrimental 14-day impact on intestinal function and microbial colonization. Researchers are now investigating alternative ways including enzymes and phytogenic feed additives like spices, herbal plants and products made from them since the use of antibiotics as growth promoter in farm animals is prohibited (Diarra and Maloum, 2014 and Pandey *et al.*, 2019). In broiler diets, phytogenic feed additives are utilized and throughout the early phases of life, their effective economic influence on bodyweight and feed conversion ratio had been quite noticeable. The inner bark of the cinnamon tree is where the natural spice cinnamon is found. Global distribution is seen for this tree (Vangala pati *et al.*, 2012). Because it contains a variety of phytochemicals, including cinnamaldehyde, eugenol, caryophyllene, and plenty of water and fat-soluble vitamins, as well as phytonutrients like β-carotene, β-cryptoxanthin, lutein, and lycopene, cinnamon bark may be significant as a phytogenic feed additive within the starting diet (Rao and Gan, 2014). Based on studies by Fauvelle *et al*. (2017), Noshirvani *et al*. (2017), Sharma *et al.* (2016), Sun (2016), and other researchers. Cinnamon had been reported to possess antiviral, antibacterial, antioxidant, and antidiabetic properties. According to reports, cinnamon increases hunger, helps the digestive process by secreting digestive enzymes, and can thus enhance broiler performance (Kumar *et al.*, 2014). The aim of this study was to investigate the effect of varying levels of *Cinnamomum ceylon* powder (CCP) supplementation on growth performance of broiler chicken.

MATERIALS AND METHODS

Location of the experimental site: The study was carried out in the Poultry unit, Teaching and Research Farm, Department of Agricultural Technology. The Federal Polytechnic, Ado, Ekiti-State, Nigeria. The state is situated in the nation's southwest. Ekiti State covers a land area of 6355km square (2,453sqm) with a population of estimated in 2010 to be 3,737,199. It enjoys a tropical climate with two different seasons

these are dry and wet season (April to October) rainy season (November to March) dry season. Ado-Ekiti has a temperature range between 21^0C to 28^0C.

Site Preparation

The poultry house was thoroughly washed, fumigated and disinfected. The house was allowed to stay for two weeks before the arrival of experimental birds and proper weeding of the surrounding was carried out to prevent reptiles.

Test ingredients

The test ingredient *Cinnamomum ceylon* powder (CCP) supplementation used was obtained from a local market. The bark was crushed and ground using a blender to a fine powder (particle size: 0.25-0.30mm) and was packed into an airtight container.

Management of experimental birds

A total number of 128 birds of Cubb-500 breeds were used for the experiment. The birds were purchased from a reputable hatchery for this study. The chicks were brooded for two weeks for acclimatization using electric bulb as a source of light and heat in the pen. In the brooding house enough provision was made for space, ventilation, polythene were also used to cover the pen to provide warmth and protection against predators and extreme of weather. They were fed the experimental diet for 8weeks. Proper and adequate management practice was observed. All vaccination were given as appropriate through the period of the experiment. Feed and water were given *ad-libitum.*

Experimental diets

The composition of experimental diets were presented in tables 1 below. The basal diets were formulated for broiler starter (0-28 day) and finisher (29-56 day). The experimental diets used for the study were compounded on the floor at the premises of the Teaching and Research Farm, Federal Polytechnic, Ado-Ekiti. The diets were formulated to be iso-caloric and iso-nitrogenous. Diet 1- control diet (diet without supplementation), diet 2- contained 0.2% CCP supplementation, diet 3 contained 0.4% CCP supplementation and diet 4- contained 0.6% CCP supplementation.

Table 1 Composition of experimental diet (%) for broiler starter and finisher

Ingredients	Broiler starter	Broiler finisher
Maize	51.00	60.00
Soybean cake	23.00	15.00
Groundnut cake	16.00	16.00
Fish meal	2.00	2.00
Bone meal	4.00	3.00
Limestone	2.00	2.00
Broiler premix	0.25	0.25
Methionine	0.25	0.25
Lysine	0.25	0.25
Common salt	0.25	0.25
Vegetable oil	1.00	1.00
Total	**100.00**	**100.00**
Calculated composition		
Metabolizable Energy	2938.00	3031.00
Crude protein	24.68	19.50
Calcium	2.35	1.99
Phosphorus	0.84	0.65
Lysine	1.33	1.27
Methionine	0.60	0.58

Experimental design

A total one hundred and twenty eight birds were used in this study. There were four experimental diets with four replicate per treatment. Eight birds were allocated per replicate amounting to 32 birds per treatments using a completely randomized design. The birds were used to access the varying levels on the growth performance of broiler chicken.

Data collection

The growth performance : Body weight and feed intake of the experimental birds were taken weekly. The average body weight (BW) was calculated by determining the differences between the initial weights and final live weights of the birds in the experimental group. Feed conversion ratio was calculated by dividing the feed intake by the weight gain.

Statistical Analysis: The data obtained in the study were subjected to one-way analysis of variance using the SPSS software programme. The means were compared using Duncan's Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

The result of the effect of varying levels of cinnamon on growth performance of broiler chicken is shown in Table 2. There were significant differences in final live-weight, body weight gain, feed intake and feed conversion ratio among treatments ($p<0.05$). The highest final live-weight (FLW) was recorded for birds fed 0.4% CCP supplemented diet at 3047.48g while the least FLW was recorded for birds on control diet at 2754.48g. The body weight of birds on 0.4% and 0.6% CCP supplemented diets were similar ($P>0.05$) but significantly ($P<0.05$) higher than birds on control diet and 0.2% CCP supplemented diet. The feed intake of birds on diets 3 and 4 were similar ($P>0.05$) but significantly ($P<0.05$) higher than birds on control diet and diet 2. The highest feed intake was recorded for birds on 0.4% CCP supplemented diet at 6215.18g while the lowest feed intake was recorded for birds on control diet at 5709.90g. The FCR of birds on control diet and 0.6% CCP supplemented diet were similar ($P>0.05$) but significantly ($P<0.05$) higher than the values recorded for birds on 0.2 and 0.4% CCP supplemented diet.

Table 2. Effect of varying levels of *Cinnamomum ceylon* on growth performance of broiler chickens

Parameters	*Cinnamomum ceylon* inclusion (%)				SEM	*p- value*
	T1	T2	T3	T4		
	0	0.2	0.4	0.6		
Final liveweight (g)	2754.48^{c}	2872.48^{b}	3047.48^{a}	2927.48^{a}	8.9	0.02
Body weight /b/d (g)	48.55^{c}	50.49^{b}	53.62^{a}	51.47^{a}	2.37	0.03
Feed intake/b/d (g)	101.96^{c}	103.49^{b}	110.99^{a}	109.63^{a}	8.56	0.04
Feed conversion ratio	2.10^{a}	2.05^{b}	2.07^{b}	2.13^{a}	0.02	0.01

Means within a row with different letters are significantly different ($P<0.05$)

The presence of active ingredients in CCP such as eugenol and cinnamon aldehyde, may increase feed utilization efficiency and boost growth rate. This could account for improvements in body weight and feed conversion ratio in birds fed a 0.4% and 0.2% supplemented diet, respectively. This demonstrates the appetite-stimulating, digestion-promoting, and antibacterial qualities of herbs and spices (Kamel, 2001). Aromatic herbs, including cinnamon, were employed to simulate the effects of a chicken's digestive system. Shirzadegan *et al*. (2012), in contrast, observed that adding aromatic plants to broiler diets had the opposite impact on bodyweight. According to Koochacsaraie *et al*. (2011), it was shown that the insulin regulating mechanisms of feed intake comprise the lipostatic theory, thermostatic theory, glucostatic theory, and protein intake hypothesis. Furthermore, research suggested that whereas hyperglycemia increases the animal brain's center of satiety, hypoglycemia activates a neurological system related to feed consumption. The decrease in feed intake seen in the control diet group compared to the treatment group might potentially be attributed to either the glucostatic hypothesis or the elevation of glucagon levels. When compared to other experimental diets, the 0.6% cinnamon supplemented diets performed the lowest (FCR). This might be because of the potential harmful effects of the components included in the spice, including coumarin, alkaloids, and other antinutritional factors (Shirzadegan *et al*., 2012).

CONCLUSION

In this study, supplementing varying levels of cinnamon powder in the diet increased the final liveweight of broiler chickens and improved the feed conversion ratio (especially at 0.2% level).

RECOMMENDATION

In this study, 0.2% Cinnamon supplemented diets is hereby recommended.

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