

INFLUENCE OF BLACK PEPPER (*Piper nigrum*) AS GROWTH PROMOTER ON PERFORMANCE OF STARTER BROILER CHICKS.

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ABSTRACT

A feeding trial was carried out to determine the effect of black pepper as a growth promoter on performance of starter broiler chicks. 150 Abor Acre unsexed day old chicks were used in a 3 week feeding trial. Five diets were formulated which contained 0.00, 0.25, 0.50, 0.75 and 1.00% ground black pepper respectively. Each diet formed a treatment which was offered to a group of birds. Each treatment was replicated thrice and contained 10 birds in a completely randomized design. Birds on diets had 0.25 and 0.5 % BP improved live weight significantly ($P<0.05$). Feed intake was significantly ($P<0.05$) reduced by 1.00%. There were no significant differences ($P>0.05$) in daily gain, feed: gain ratio and protein efficiency ratio. In conclusion, 0.25% black pepper could be added to starter broiler diet to improve performances.

INTRODUCTION

With the increasing demand of poultry meat world over, poultry farmers want to improve the productivity of broiler chickens. Their interest is in the type of feed that could achieve this in a good period of time, probably between 6 and 7 weeks. With good nutrition, broilers could attain live weight of 2.0kg within this period (Ndelekwute, 2011). This challenge has necessitated poultry nutritionists to proffer certain nutritional strategies for rapid growth of broilers. Feed additives that promote growth have been recommended as one of the strategic options. Pharmaceutical antibiotics as one of the options have been widely used (Maynard *et al.*, 1984), but drug resistance problem emanating from their use has made nutritionists to look inward for alternatives. Such alternative feed additives are probiotics, yeast, prebiotics, organic acids and feed grade enzymes (Choct 2007; Windisch *et al.*, 2007; Ndelekwute *et al.*, 2014). The search is continuing and bioactive plant materials otherwise known as phytochemicals have been adjudged to be other good alternative (Wei and Shibamoto 2007). Phytochemical compounds such as essential oils and spices have been reported to exhibit growth promoting properties (Windisch *et al.*, 2007). Black pepper is a spice which is reported to have antibacterial and antioxidant properties in addition to its ability to enhance secretion of gastric and pancreatic juices that contain enzymes which improve digestibility (Sirinivasan, 2007). Generally, spices are reported to have positive effect on villi's nutrient absorption

and reduction of digesta viscosity (Sirinivasan 2007). These positive properties could be explored for better broiler productivity. Therefore, the objective of the experiment was to determine the effect of black pepper on growth of starter broiler chickens.

MATERIALS AND METHODS

Site of Study

The experiment was conducted at the Teaching and Research Farm of Department of Nutrition and Forage Science of the Michael Okpara University of Agriculture Umudike; Abia State, Nigeria.

Procurement and Processing of Experimental Material

The black pepper seeds used in this study were purchased from the market in dry form. The seeds were separated from the stalk debris contained in the mixture. Thereafter, the seeds were ground into powder form and stored in an air-tight plastic container. The ground black pepper was then stored in a dry place before use.

Experimental Design and Management of Birds

Completely randomized design (CRD) was used. One hundred and fifty (150) day old chicks of AborAcre-plus strain were used. There were divided into five dietary treatments (T1 – T5) Each treatment was replicated three times. Each replicate had 10 birds. The diet contained 0.00, 0.25, and 0.5, 0.75 and 1.00 % black pepper respectively. Birds were fed the control diet containing no black pepper for the first week of life in the brooding room. Black pepper was introduced into the diet during the second week

and the experiment lasted for 3 weeks. Five diets were formulated. The diets were isonitrogenous (22 %) and isoenergetic (12 MJME/kg) (Table 1). Trial and error method of feed formulation using Microsoft Excel Package was used to formulate the diets. The birds were stabilized for one week in the brooding room. At the second week, they were randomly allotted to the five different treatment groups, weighed and transferred to a rearing house covered with water proof material where brooding continued to the third week. The birds were vaccinated against Newcastle disease and Infectious bursal disease.

Data Collection and Analysis

Data collected were live weight and feed intake which were used to calculate the feed: gain ratio, protein intake and protein efficiency ratio. The data were subjected to analysis of variance (ANOVA). Significant means were separated using Duncan New Multiple Range Test (DNMRT) according to Steel and Torrie (1980).

RESULTS AND DISCUSSION

Effect of black pepper at the starter phase is shown in Table 2. The initial live weight of chicks at the end of the stabilization period showed no significant difference. Final live weight and feed intake were significantly ($P < 0.05$) influenced by level of BP inclusion. BP at 0.25 and 0.50% produced heavier body weight compared to the control. At 1.00%, there was a significant ($P < 0.05$) reduction in live weight. This signifies that at higher level, BP could become detrimental to growth. Abaza *et al.* (2008) reported improvement in live weight and weight gain of broiler chickens fed 0.1% black pepper oil at 4 weeks of age, confirming the importance of black pepper as growth promoting feed additive. BP at 1.0% negatively affected feed intake which could be linked to the poor growth recorded at that level. There were no significant differences ($P > 0.05$) in feed: gain ratio, protein intake and protein efficiency ratio. Despite this, black pepper at each level showed marginal superiority in the three parameters mentioned. According to Abaza *et al.* (2008) overall feed intake was lowered in chicks fed higher level of black pepper thus supporting this work. However, their earlier work, Abaza *et*

al. (2003) contradicted the present work if feed: gain ratio is to be considered. They reported that 0.25% black pepper oil improved feed gain: ratio. Going by this result, 0.25% black pepper could be added to starter broiler diet to improve performance.

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Table 1: Ingredients and Nutrients Composition of Starter Diets

Ingredients	T ₁ (0.00%)	T ₂ (0.25%)	T ₃ (0.5%)	T ₄ (0.75%)	T ₅ (1.0%)
Maize	55.0	55.0	55.0	55.0	55.0
Soybean meal	28.0	28.0	28.0	28.0	28.0
Fish meal	3.00	3.00	3.00	3.00	3.00
Palm kernel cake	10.3	10.1	9.8	9.55	9.30
Bone meal	3.0	3.0	3.0	3.0	3.0
Black pepper	-	0.25	0.50	0.75	1.00
Salt (NaCl)	0.25	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0.10	0.10	0.10
Methionine	0.10	0.10	0.10	0.10	0.10
Premix	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Determined composition (%)					
Crude protein	22.1	22.1	22.1	22.0	22.0
Energy (MJME/kg)**	12.0	12.0	12.0	12.1	12.1
Ether extract	3.92	3.94	3.96	3.98	4.00
Crude fibre	5.01	4.98	4.95	4.92	4.89
Calcium**	1.20	1.20	1.20	1.10	1.10
Phosphorous**	1.01	1.01	1.01	1.00	1.00
Lysine**	1.12	1.12	1.12	1.12	1.12
Methionine**	0.65	0.65	0.65	0.65	0.65

*premix supplied per kg diet: vitamin A 15,000 I.U, vitamin D₃ 13000 iu, thiamin 2mg, Riboflavin 6mg, pyridoxine 4mg, Niacin 40mg, cobalamine 0.05g, Biotin 0.08mg, chooline chloride 0.05g, Manganese 0.096g, Zinc 0.06g, Iron 0.024g, Copper 0.006g, Iodine 0.014g, Selenium 0.24mg, Cobalt 0.024mg and Antioxidant 0.125g.

** Calculated values. CON = Control; BP = Black pepper. NFE = Nitrogen free extract

Table 2: Performance of Starter Broilers fed graded levels of BP

Parameters	T ₁ (0.00%)	T ₂ (0.25%)	T ₃ (0.5%)	T ₄ (0.75%)	T ₅ (1.0%)	SEM
Initial body weight(g)	113	113	111	109	108	3.11
Final body weight(g)	820 ^{bc}	890 ^a	892 ^a	851 ^{ab}	792 ^c	13.0
Daily weight gain(g)	33.7	37.0	37.2	35.3	32.5	2.18
Daily feed intake(g)	69.0 ^b	70.3 ^a	69.0 ^a	67.2 ^{ab}	65.4 ^b	2.16
Feed: gain ratio	2.05	2.00	1.86	1.90	2.0	0.04
Daily protein intake	14.8	15.0	14.8	14.34	2.3	1.21
Protein efficiency ratio	2.28	2.46	2.52	2.45	2.32	0.13

abc. Means along the same row with different superscripts are significantly different at P<0.05. SEM = Standard error of mean. BP = Black pepper