

EFFECTS OF HOT RED PEPPER (*Capsicum annum L.*) IN DIETS FOR BROILER CHICKENS

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ABSTRACT

A study using 180, two weeks old Anak broiler chicks 45 birds/treatment with nine replicates and five birds per replicate was conducted to evaluate the effects of hot red pepper (HRP) powder as natural feed additives on growth performance of broiler chickens. Completely Randomized Design was adopted (CRD). Commercial broiler diets used where formulated to meet the nutrient requirements of broiler chicks containing HRP powder at levels 0%, 1.0%, 1.25% and 1.5%. Results showed that significant increase ($P<0.05$) in Average Feed Intake (AFI) ranged from 77.81g to 74.16g with broilers fed 1% HRP inclusion diet and control diet respectively. Broilers fed the control diet 0.0% HRP inclusion had lower ($P>0.05$) Average Body Weight Gain (ABWG)(38.11g) as well as least Feed Conversion Ratio (FCR)(1.96). Significant cost/kg weight gain was found in birds fed HRP inclusion diets 2,3, and 4. Conclusively, hot red pepper (*Capsicum annum L.*) inclusion has the potential of enhancing feed intake, body weight gain, feed conversion ratio and cost/kg weight gain of broiler chickens. Broilers tolerate up to 1.5% without adverse effects on performance.

Keywords: Anak, Average feed intake, feed additives, Broiler chicken.

INTRODUCTION

Food insecurity is a major challenge that emerging countries must overcome. For satisfying populations' needs in animal products world – wide according to demographic growth, the production of these countries will have to be more than 100 billion tons of meat in 2020 (Dougnon *et al.*, 2014).

In many countries, as well as in Nigeria, consumer preference is pushing the poultry industry to produce animals without antibiotics as growth promoters. Apart from an important role of antibiotic for (therapeutic) improvement of health and well-being of animals, most were given for (prophylactic) preventive purposes and to improve growth rate and Feed Conversion Ratio (FCR). However, due to the emergence of microbes resistant to antibiotics use in animal nutrition, alternative growth promoters must be harassed. Removal of antibiotics as growth promoters has led to reduced growth performance and feed efficiency as well as increased incidence of enteric disorders such as necrotic enteritis in poultry (Dibner and Richards, 2005). Hot red peppers (*Capsicum annum L.*) are one of the most important spices that are widely used in human nutrition. Hot red Peppers are rich in Vitamin C, which have a

considerable impact in improving poultry production through contributing to the reduction of heat stress.

Al – Kassie *et al.* (2011) and Puvaca *et al.* (2015) as well Zomrawi *et al.* (2012) advocated the inclusion of red chilli pepper (*Capsicum annum L.*) and ginger root powder (*Zingiber officinale*) up to 1.0% and 1.5% respectively. Ensuring food security of rural and urban populations in Africa, then new programs of livestock development be moving towards the promotion in the use of biological products, including enzymes, probiotics, prebiotics, symbiotic, organic acids and plant extracts (phytobiotics), as alternative to antibiotic food additives in diets for monogastric animals. This study therefore investigated the effects of Hot Red Pepper (HRP) (*Capsicum annum L.*) on productive performances of broiler chicken.

MATERIALS AND METHODS

Experimental Diets

The sun – dried hot red pepper used in this experiment was obtained in larger quantity form maya market in Ibarapa Area, then ground into powder. Commercial broiler diets used were formulated of isocaloric and isonitrogenous to meet the nutrient required of broiler birds. Diet 1

served as a control 0% (without HRP). Diets 2, 3 and 4 contained 1.0%, 1.25% and 1.50% of hot red pepper respectively. The chemical composition of commercial broiler diets shown in Table 2.

Experimental birds and management.

A total of one hundred and eighty, two – weeks old Anak broiler chicks were used for the study. Birds were divided into 4 treatments (45 birds/treatment) with nine replicates and five birds per replicate using Completely Randomized Designed (CRD). Vaccination Programmes were strictly followed.

Feed and water were provided ad libitum. Data collected were recorded weekly, feed consumption, weight gain and Feed Conversion Ratio (FCR) were used as measures of birds performance

$$FCR = \frac{\text{feed intake}}{\text{body weight gain}}$$

RESULTS AND DISCUSSION

The chemical composition of the test diet indicated an optimum crude protein value of 22.5% and 20.01% for both starter phase and finisher phase respectively. (Olomu, 2003) Data from Average Feed Intake (AFI) ranged from 77.81g to 74.16g, Average Body Weight Gain (ABWG) increased significantly ($p < 0.05$) across the dietary treatment (diet 1: 38.11g, diet 2: 41.81g, diet 3: 40.98g, diet 4: 40.16g). Feed Conversion Ratio (FCR) and cost/kg weight Gain are shown (Table 3). Birds fed hot red pepper (HRP) had higher AFI and ABWG, compared to birds fed control diets. This may be due to associated effect of the feed composite 1%, 1.25% and 1.5% dried supplementary HRP powder in the diets 2, 3 and 4 (Adedoyin, 2014). The FCR (1.86) and cost/kg weight Gain (₦ 1023.95) were however, significantly ($P < 0.05$) better in birds fed diet 2 (1% inclusion HRP) in compare with the dietary treatments, 1, 3 and 4. This can be caused from the effects of dietary and nutrition increase resulted from an Average feed intake (AFI) of 77.81g/b/d in diet 2 as compared with others diets. The highest mortality rate (4.4%) was recorded in the control diet while compared with 2.7%, 0.0% and 0.0% of diets 2 (1% inclusion HRP), 3 (1.25% inclusion HRP) and 4 (1.5% inclusion HRP) respectively (Greathead, 2008). It may be that the level of hot red pepper used

reflects the high activity of stimulant, carminative, digestion and anti – microbial properties included in the broiler diets which may have improve the positive flow of digestive juices across the stomach. The positive results concerning mortality ratio of HRP activity in birds fed diets 2,3 and 4 can be an indicative of better phagocytosis within the cells inter-pheron (Frankic *et al*, 2009).

CONCLUSION

In conclusion hot red pepper (HRP) powder in the broiler diets at levels of 1% and 1.25% better an average feed intake and feed conversion ratio. Broilers tolerate up to 1.5% without adverse effect on performance.

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Table 1: Gross Concentration of hot red pepper powder in Commercial Broiler Diets

Diets	In late starter g/100g 14 – 35 days	In finisher, g/100g 35 – 56 days
Diet 1 (control)	0.0	0.0
Diet 2	1.0	1.0
Diet 3	1.25	1.25
Diet 4	1.50	1.50

Table 2: Chemical Composition of Commercial Broiler Diets (g/100g)

Nutrients	Starter	Finisher
Dry matter	89.4	89.3
Moisture	10.8	10.5
Crude Protein	22.01	20.5
Ether Extract	5.1	3.8
Crude Fibre	3.5	3.6
Ash	5.0	6.0
Metabolisable Energy Kcal/kg	3000.8	3000.81
Phosphorus	0.45	0.7
Calcium	1.2	1.5
Methionine	0.56	0.52
Lysine	1.2	1.2

Table 3: Performance of Broiler Chicken Fed hot red pepper (*Capsicum annum L.*) Powder Diets.

Diets+ Additive	Parameters							
	Average feed intake g/b/d	Average Body weight Gain g/b/d	FCR	Cost/kg Additive	Cost/ kg Feed (₦)	Cost/feed consumed(₦)	Cost/kg Weight Gain	Mortality (%)
1(control)	74.16 ^{bc}	38.11 ^b	1.96 ^a	21.00	141.50	440.73	1156.50	4.4 ^a
2(1% inclusion)	77.81 ^a	41.81 ^a	1.86 ^{bc}	10.00	131.00	428.11	1023.95	2.7 ^b
3(1.25% inclusion)	77.09 ^a	40.98 ^{ab}	1.88 ^b	10.28	131.28	425.06	1037.23	0.0 ^c
4(1.5% inclusion)	76.01 ^{ab}	40.16 ^{ab}	1.89 ^b	10.50	131.50	419.80	1045.31	0.0 ^c
SEM±	3.03	4.03	0.11					2.1

abc... Means within coloum with different superscripts are significant (p<0.05)

SEM±: Standard Error of the means

FCR: Feed Conversion Ratio

g/b/d: grams/bird/Day.