



EFFECT OF HIGH FIBRE DIET WITH OR WITHOUT ENZYME ON GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF BROILER CHICKENS

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Abstract

An eight weeks feeding trials was conducted to evaluate the Influence of high fibre diet fed to broilers chicken on growth and carcass performance. A total of two hundred and forty, one-day old Arbor Acres broiler chicks obtained from a commercial hatchery were used for the trial. An average (33 ± 0.12 g body weight) were weighted individually and randomly divided into three (3) Treatment with ten replicate per treatment and eight birds per replicate using a completely randomized design. The diet contained T1= 8.70% fibre; T2= 13.10% with enzyme and T3= 13.10% fibre without enzyme. Parameters measured were the daily feed consumption, weekly body weights, weight gain and feed conversion ratio were properly recorded. Carcass performance parameters were measured and recorded for both the external and internal organs. Data were analysed using descriptive statistic and ANOVA at $\alpha_{0.05}$. There were no significant differences ($P < 0.05$) for weight gain and feed conversion ratio while Treatment 3 had the highest daily feed consumption and weekly body weights with least daily feed consumption, and weekly body weights in Treatment 1. The result shows that there were not differs in carcass performance, external organs weight as well as internal organs weight. In conclusion, broiler chicken can be fed with 13.10% fibre diet without enzyme without any adverse effect on the growth and carcass performance.

Keywords: Growth performance, carcass performance, high fibre diet, feed conversion ratio, broiler chicken

Introduction

The aim of farmers is to ensure high productivity and profitability. Due to the high competition for conventional feeding stuff such as maize between human and animal to meet their energy requirement which has lead to high cost of production and in turns reduce the profits (Samuel Etop *et al.*, 2018). Farmers has adopted the use of alternative feeding materials that are less or not consumed by humans and yet meets the energy requirement of animal such as broiler chicken. Such feeding material is fiber from cereals such as rice, corn, wheat and oat.

Fiber content of diets is mainly more important in ruminants; however there are good results with fiber content in non-ruminants as pigs and poultry (Abo Omar, 2005). Fiber provides health benefits, with several physiological functions (Bersamin *et al.*, 2008). Also, fiber in feed ingredients may affect cecal microbial population, nutrient digestibility, and volatile fatty acid production. Interactions of these effects can affect bird performance (Walugembe, 2013).

Thus, this study is designed to investigate the Influence of high fibre diet fed to broilers chicken on growth and carcass performance.

MATERIALS AND METHODS

Experimental site:

The experiment was conducted at Poultry unit Division of National Veterinary Research Institute, Vom Plateau State, Nigeria.



Experimental animal and management:

A total of two hundred and forty, one-day old Arbor Acres broiler chicks obtained from a commercial hatchery were used for the trial. An average (33 ± 0.12 g body weight) were weighted individually and randomly divided into three (3) treatment with ten replicate per treatment and eight birds per replicate. The brooding temperature was kept at an average of 26.5°C from the first to second week of age. Thereafter, the temperature was lowered to 22°C for the rest of experimental period. Wood shaving was used as litter material. At DOC, antibiotic and anti-stress were given to the birds for three days. From week two to three, first and second Infectious Bursal Disease Vaccine (IBDV) was administered. Then, at week four and five Anticoccidial drug and Newcastle Disease Vaccine Lasota were given to the birds respectively. The experiment was conducted for the period of eight weeks. The daily feed consumption, weekly body weights, weight gain and feed conversion ratio were properly recorded. Carcass performance parameters were measured for both the external and internal organs.

Experiment diet: Three experiment diet was formulated with high fibre content as shown in Table 1.

Table 1: Feed composition

Ingredients	T1	T2	T3
Lysine	0.35	0.35	0.35
Methionine	0.20	0.20	0.20
Premix	0.45	0.45	0.48
Salt	0.37	0.37	0.37
Enzyme	0.03	0.03	-
Toxin Blinder	0.02	0.02	0.02
GNC	27.90	27.90	27.90
Maize Bran	25.00	60.00	60.00
Rice Bran	7.50	7.50	7.50
Bone Meal	2.40	2.40	2.40
Lime Stone	0.60	0.60	0.60
Oyatozyme	0.20	0.20	0.20
Maize	35.00	-	-
	100.016	100.016	100.016
Total Percentage	100	100	100

Nutrients Composition of Diets			
Metabolizable energy (Kcal/Kg)	3197.00	2984.00	2716.00
Crude Protein %	18.16	18.50	17.83
Crude Fat %	7.40	9.15	9.15
Crude Fibre %	8.70	13.10	13.10
Ash %	5.20	6.24	6.24
Calcium %	1.50	1.50	1.22
Available Phosphorus %	0.67	0.72	0.42
Methionine %	0.49	0.46	0.46
Lysine %	0.95	1.00	0.96
Methionine + Cystine %	0.77	0.76	0.74

T1= Control (8.7% Fibre); T2= 13.10% Fibre with enzyme T3= 13.10% Fibre without enzyme

Experimental design: Completely randomized design was used.

Statistical Analysis: Data obtained were subjected to analysis of variance using SAS (2010). The means were separated using Duncan's Multiple Range Test of the same procedure.



Results and discussion

The growth performance was shown in Table 2. The fiber had no effect on both the weight gained and FCR among the treatments. The feed intake /week/ replicate was higher ($p < 0.05$) in Treatment 3 with least values in Treatment 1. Furthermore the feed intake/bird/week was also higher in both Treatment 2 and 3. In agreement with previous reports (Donkoh *et al.*, 1999; Loar *et al.*, 2010; Lumpkins *et al.*, 2004;), broiler chicks' body weight gain was reduced at higher concentrations of high fiber dietary ingredients which was in line with the findings of the study, although there was no significant difference in the weight gained. A possible explanation for the reduced performance could be that inclusion of high fibre source in broiler diets.

Table 2: Growth performance of broiler chicken fed high fibre diet

Parameters	T1	T2	T3	SEM
Initial weight(g)	40.50	40.75	39.90	0.50
wgt gain/wk(g)	239.84	271.2	265.6	12.15
FI/WK/REP(g)	8077.39 ^b	9999.97 ^a	10111.31 ^a	374.27
FI/Bird/wk(g)	479.18 ^b	566.23 ^a	561.74 ^a	16.68
FCR	2.64	2.11	2.21	0.22

^{a,b,c} Means across rows with different superscripts differ significantly at $P < 0.05$; wgt: Weight; wk: Week; FI: Feed Intake; F.C.R: Feed Conversion Ratio; S.E.M: Standard Error of the Mean
T1= Control (8.7% Fibre); T2= 13.10% Fibre with enzyme T3= 13.10% Fibre without enzyme.

Table 3: Carcass performance as affected by high fibre diet

Parameters(Kg)	T1	T2	T3	SEM
Live Weight	2.12	2.30	2.30	0.07
Bled Weight	2.02	2.21	2.22	0.07
Defeathered weight	1.95	2.11	2.12	0.07
Eviscerated Weight	1.71	1.84	1.83	0.06
Dressed Weight	1.44	1.58	1.57	0.06
Dressed percentage(%)	68.29	68.78	68.31	0.18

^{a,b,c} Means across rows with different superscripts differ significantly at $P < 0.05$
T1= Control (8.7% Fibre); T2= 13.10% Fibre with enzyme T3= 13.10% Fibre without enzyme.

Table 4: External organs of broilers as affected by high fibre diet

Parameters(g)	T1	T2	T3	SEM
Head	56.00	57.00	56.67	1.24
Neck	90.00	100.00	101.33	2.93
Shank	87.00	94.33	93.33	2.22
Abdominal fat	14.67	21.67	26.67	3.17

^{a,b,c} Means across rows with different superscripts differ significantly at $P < 0.05$
T1= Control (8.7% Fibre); T2= 13.10% Fibre with enzyme T3= 13.10% Fibre without enzyme.



Table 5: Internal organs of broilers as affected by high fibre diet

Parameters(%)	T1	T2	T3	SEM
Liver Weight	2.01	1.90	2.13	0.08
Heart Weight	0.53	0.51	0.49	0.03
spleen weight	0.20	0.17	0.13	0.02
bile weight	0.05	0.13	0.10	0.02
Gizzard Weight	2.57	1.91	2.40	0.14
Empty gizzard	1.65	1.41	1.68	0.09
Intestine weight	5.23	4.79	4.53	0.21
Intestine length(cm)	11.18	10.10	8.28	0.61
Proventriculus	0.29	0.31	0.35	0.03

^{a,b,c} Means across rows with different superscripts differ significantly at $P < 0.05$

T1= Control (8.7% Fibre); T2= 13.10% Fibre with enzyme T3= 13.10% Fibre without enzyme.

Table 3, 4 and 5 showed that treatments had no significant ($P > 0.05$) effect on both the external and internal organs such as weights of necks, heads, shanks, abdominal fat, livers, hearts, spleens, bile, gizzards, empty gizzards, intestinal weight, intestinal length and proventriculus, as these parameters did not show differences ($P > 0.05$) across the diets. The result obtained could be due to include higher total intake of high fiber feed ingredients in the broiler chicks resulting in reduced both the internal and external organs.

Conclusion

In conclusion, broiler chicken can be fed with 13.10% fibre diet without enzyme without any adverse effect on the growth and carcass performance.

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