

GROWTH PERFORMANCE AND HAEMATOLOGICAL CHARACTERISTIC OF BROILER FINISHER CHICKENS FED VARYING PROTEIN LEVELS DURING RAINY SEASON IN SEMI ARID REGION OF SOKOTO.

H. Zakari, A. Abubakar and A.U.Abdullahi

ABSTRACT

This study aimed at investigating the growth performance and haematological characteristic of broiler chickens fed graded levels of protein during 28 days trials. The dietary groups were designated as T1 (19%), T2 (20%), T3(21%) and T4(22% CP). A total of one hundred and sixty (160) four week-old broilers were used for the measurement. Birds were allotted to four treatment groups of 10 birds each with four replicate in a completely randomized design (CRD). The growth performance and haematological characteristics were evaluated. Results revealed significant ($P<0.05$) differences in some of the performance parameters (weight gain and water intake) except feed intake, cost of feed, FCR and mortality that were not affected. Hematological parameters were significantly influenced by the dietary protein levels. Only LDL and AST were not significantly affected by the protein levels. It could be concluded that dietary protein levels between 20 and 21%CP with 3100kcal/kg ME can improve the growth, physiological and nutritional status of broiler chickens. Therefore, T4 diets could be recommend in rainy season.

INTRODUCTION

In tropical environments like Nigeria, seasonal variation is one of the major non-genetic factors that affect poultry production. For instance, the cold rainy season affects both poultry production and the general wellbeing of poultry. The rainy season is usually synonymous with an increase in relative humidity and a reduction in temperature; rainfall affects both the quality and quantity of feeding, while wind speed has an impact on outbreak of diseases. Similarly, according to the findings by Geogory, (2010) opined that short-range climate change effects on the meat quality varies between regions.. According to Afolabi *et al.* (2010) changes in haematological parameters are often used to determine health status of the body and to know the degree of the environmental, nutritional and pathological stress. To date, there is paucity of information in the available literature on the growth and haematological characteristics of broilers. Based on the foregoing, this study was initiated.

MATERIALS AND METHODS

Study Area

The experiment was conducted at veterinary centre Usmanu Danfodiyo University sokoto. The state is located between longitude 5.24°N and latitude 13.06°E with 265 meters above the sea level (Sokoto Geographical Data, 2019).

Experimental design

One hundred and sixty (160) day old *Marshall Strain* broiler chicks were used during rainy season feeding trials in a complete randomized design. The birds were divided into four treatment groups of 40 birds per group with four replicates of 10 chicks per replicate and were randomly allotted to four dietary treatments at each of the growth phase.

Experimental birds and their management.

The *Mashall Strain* chicks were obtained from hatchery (Zartech) at Ibadan. Routine management practices, medication and vaccines were maintained for all the treatment groups as recommended by (Oluyemi and Roberts, 2000).

Experimental diets

Four diets were formulated for the feeding trial. The gross and calculated chemical composition of the experimental diets is shown in table 1.

Table 1: Gross and calculated chemical composition of experimental diets fed to broilers at finisher (4-6wks)

Ingredient (%)	T1 (19%CP)	T2 (20%CP)	T3 (21%CP)	T4 (22%CP)
Maize	63	60	57.5	55
Soya beans meal	4	5	7	8
Groundnut cake	9	11	12	14
Wheat offal	13	13	12.5	12
Blood meal	6	6	6	6
Lime stone	1.5	1.5	1.5	1.5
Bone meal	1.5	1.5	1.5	1.5
Premix	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25
Total	100	100	100	100
Calculated Chemical Composition				
Metabolizable energy (kcal/kg)	3100	3100	3100	3100
Crude protein (%)	19.0	20.0	21.0	22.0
Crude fibre (%)	4.2	4.6	4.8	5.0
Ether extract (%)	4.4	4.5	4.6	4.5
Calcium (%)	9.0	1.0	1.0	1.0
Phosphorus (%)	4.4	4.3	4.5	5.0
Methionine (%)	0.5	0.5	0.5	0.5
Lysine (%)	1.0	1.0	1.0	1.0

Premix: Vitamin A 30000000 i.u., Vitamin D3 000000 i.u.; VitE 30000 i.u.; Vitamin K 2000mg, Vitamin B2 30000mg, Vitamin C30g, Niucin40000mg, panthothemic acid 12000mg, Vitamin B61500mg, Vitamin B12 100000mg, Folic Acid 1000mg, Biotin 400mg, Choline chloride 300000mg, Cobalt 200mg, Copper 1200mg, Iodine 2000mg, Iron 40000mg, Manganese 100000mg, Selenium 150mg, Zinc 30mg, Antioxidant 1250mg.

Data collection

The performance parameters determined daily were feed intake and water intake. Weight gain was monitored weekly. Feed conversion ratio was calculated as the ratio of feed intake to weight gain. Temperature was recorded daily using maximum and minimum thermometer hung in the poultry house. Mortality was recorded as it prevailed. $FCR = \frac{\text{Feedintake}}{\text{Weightgain}}$

Statistical analysis

Data generated were subjected to analysis of variance (ANOVA) using General Linear Model (GLM) programme of SPSS computer package version 21 (IBM SPSS, 2013) and statistical significant was set at

($P < 0.05$). Significant differences between means were detected using Duncan's multiple range tests (DMRT) as outlined by *Steel and Torrie* (1980)

RESULTS AND DISCUSSION.

Performance characteristics of broiler finisher chickens.

The result in Table 2. revealed that, the parameters measured for chicks of all the treatments diets were however similar except FCR which the chicks differed ($P < 0.05$) with chicks for diet 2 and 3 (1.10 and 1.22) recording better conversion of feed significantly ($P < 0.05$).

Table 2: Performance Characteristic of Broiler Fed Varying Levels of Protein Ratio at Finisher Phase During Rainy Season (3-6weeks)

Parameters	T ₁ (19%CP)	T ₂ (20%CP)	T ₃ (21%CP)	T ₄ (22%CP)	SEM
Initial body weight(g/bird)	586.11	572.15	565.82	589.72	39.58
Final body weight(g/bird)	1043.65	1096.44	1090.28	1052.08	1208.89
Average weight gain(g/bird)	457.54	524.45	524.29	462.36	124.46
Total feed intake (g/bird)	648.05	560.20	640.79	758.78	130.84
Average feed intake(g/bird/day)	92.58	80.09	91.54	108.39	18.69
FCR	1.42 ^{ab}	1.07 ^b	1.22 ^b	1.64 ^a	.48.00
Total water intake (ml/bird)	1297.28	1281.24	1392.99	1257.67	115.81
Average water intake(ml/bird)	185.33	183.03	198.99	179.67	16.54
Cost of feed (naira/kg)	4280.31	4228.28	4276.35	4246.15	6.30
Mortality (%)	0.07	0.06	0.08	0.07	0.04

ab: Means bearing different superscripts along the same row differ ($P > 0.05$)

This study is contrary to the findings by *Garcia et al.* (2000) who reported reducing CP down to 19% did not have a significant effect on broilers performance when compared with those fed high diets. *Waldroup et al.* (2005) and *Khajali et al.* (2010) found that decreasing CP levels lower than 22% significantly decreased body weight gain.

Haematological Parameters of Broiler Chickens Fed Varying Protein Levels During Rainy Season

The following parameters, such as PCV, RBC, HB, MCV, MCH and MCHC were significantly affected by the dietary treatments (Table 5.10). Birds fed diet 4 had highest PCV, RBC, Hb, MCV and MCH ($P < 0.05$) than other treatment diets. MCHC was however similar on birds fed diet 2, 3 and 4 while diet 1 differed significantly ($P < 0.05$) with diet 3.

Table 5.10: Haematological Parameters of Broilers Fed Varying Protein Levels During Rainy Season

Parameter	T1 (19%CP)	T2 (20%CP)	T3 (21%CP)	T4 (22%CP)	SEM	Reference value
pack cell volume	32.00 ^{ab}	26.75 ^c	38.75 ^{ab}	42.68 ^a	3.203	260.50- 31.90
White blood cell	15.80	14.51	16.83	19.62	1.862	2.46-6.05
Lymphocyte	81.00	78.50	80.50	78.33	2.374	-
Monocyte	1.00	0.20	0.75	1.33	0.278	0.67-1.00
Neutrophil	18.00	21.50	21.25	18.00	2.720	-
Esinophil	-	-	-	-	-	-
Basophil	-	-	-	-	-	-
Red blood cell	12.35 ^b	14.51 ^a	16.83 ^a	19.62 ^a	1.740	1.45-1.70
Haemoglobin	11.75 ^{ab}	10.72 ^b	13.37 ^a	14.25 ^a	1.869	7.37-9.80
Mean corpuscular haemoglobin	5.32 ^b	7.80 ^{ab}	8.28 ^a	9.41 ^a	2.057	52.8-58.44
Mean Corpuscular Volume	14.16 ^b	19.41 ^b	21.67 ^a	23.68 ^a	6.905	18.8-19-67
Mean Corpuscular Heamoglobin Concentration	53.24 ^b	78.09 ^{ab}	94.05 ^a	81.76 ^{ab}	20.505	27.85- 30.05

ab means bearing different superscript along the same row differed (P<0.05)

source: Adenira, *et al.* (2017)

The values of cholesterol reported for this study (150.50-330.7mmol/l) was higher than the report by Adekunle *and Omoh*. (2014) who reported 109.3-123.3mmol/l. Total protein of 4.52-5.89g/dl obtained in this study was closely related to 4.60- 5.50g/dl earlier report by Adekunle and Omoh . (2014).

CONCLUSION AND RECOMMENDATION

Diet T2 containing 20%CP recorded better performance on weight gain (524.24g) and better FCR (1.07). Haematological indices of PCV, RBC and HB of birds fed diet T4 containing 22%CP showed higher values (P<0.05). Dietary levels of 20 and 22%CP are recommended for broilers growth without compromising the physiological status of broilers. This recommendation is for climatic regions that fall within the annual temperatures of between 25.6⁰ C minimum and 29.9⁰ C maximum, having rainfall pattern of between 86-211 minimum and maximum respectively.

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