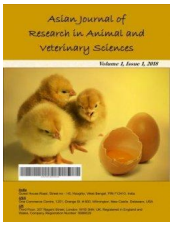

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Performance of Broiler Finishers Fed Diets Containing Varying Crude Protein Levels

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Authors' contributions

This work was carried out in collaboration among all authors. Author ISH designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors FAM and AUH managed the analysis of the study. Authors MSR, UZS and MML managed the literature searches. All authors read and approved the final manuscript.

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Short Communication

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ABSTRACT

Performance of broiler finishers fed diets containing varying crude protein levels was determined. Diets were compounded and tagged T1, T2 and T3 with percent crude protein levels of 21, 23 and 25 respectively. Two hundred and ten (210) Ross 308 four (4) week old birds were randomly allocated into one of the three dietary treatment groups with 70 birds each and replicated seven times and each replicate had 10 birds. Feed intake, water intake and body weight of the birds were determined and compared. The result of weight gain, feed conversion ratio were significantly different ($P<0.05$), for all the treatment while feed intake, water intake, mortality showed no significant difference ($P>0.05$). Feeding birds with crude protein level of 25%CP at finisher phase enhance their growth.

Keywords: Broiler finishers; diets; crude protein levels; performance.

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1. INTRODUCTION

High cost of feeding is the greatest problem of the Nigerian poultry farmers, feed cost represent over 66% of the total cost of production [1]. There are many reports that poultry feeding constitute about 70 – 80% of the recurrent cost of production, hence there is a need to utilize alternative the alternative feed ingredients that are removed from human and industrial interest in order to reduce feed cost and cost of poultry products [1].

Compared to other livestock, poultry have by far the quickest and highest rate of turnover [2]. Estimates from consumption and demand surveys in Nigeria indicate that the consumption of poultry meat is gradually out-stripping that of most other kinds of meat, except beef [2]. It is therefore not surprising that funds invested in poultry production are recovered faster than any other livestock enterprise.

Poultry are kept mainly as a source of meat and eggs. Chicken meat is very popular, being classified as white meat with low cholesterol; thus making it superior to red meat health-wise. The farmer has the choice of producing broilers, layers, or day old chicks [3]. Broilers are usually produced for meat, layers for eggs and day old chicks for restocking of the farm [3]. The traditional system of poultry rearing in the tropics is characterized by small scale operation, low productivity of indigenous breeds, poor feed conversion efficiency; as well as heavy parasitic and disease infestations [4].

For any efficient production, nutrition is very important. Thus in any locality, it is important to determine the optimum level of nutrients required for efficient production. In the North–West Zone of Nigeria, temperatures are high for most periods of the year. This makes it necessary to determine the nutrients requirements most suitable for this environment.

This work was aimed at evaluating performance of broiler finisher birds fed diets containing various levels of crude protein, in terms of feed intake, water intake, body weight gain and feed conversion ratio.

2. MATERIALS AND METHODS

This experiment was conducted at the Sokoto State Veterinary Centre, Aliyu Jodi Road in Sokoto Metropolis. Sokoto State is located in the Sudan Savannah Zone, in North-Western Nigeria, between longitudes 4°E and 6°54'E and latitude 12°O'N and 13°54'N [5]. The state has a total land area of 32,000 square kilometers, with a population of 3,666,999 million people. The state is characterized by 3 – 4 months of rainfall: from June to September or October and 7 – 8 months dry season: From October to April [5].

2.1 Experimental Diets

Three diets were formulated with different crude protein levels: 21%, 23%, and 25% designated as T_1, T_2 and T_3 respectively. The diets contained same levels of energy and other nutrients. The gross and chemical composition of the experimental diets is shown in Table 1.

Table 1. Gross and chemical composition of the experimental diets

Ingredients	Treatments		
	T1	T2	T3
Maize	50.10	46.00	41.95
GNC	28.90	35.00	41.10
Wheat offal	17.60	15.70	13.75
Bone meal	2.00	2.00	2.00
Vitamin and mineral premix	0.25	0.25	0.25
Salt	0.35	0.35	0.35
Methionine	0.35	0.35	0.35
Lysine	0.45	0.36	0.28
Total	100	100	100
Chemical composition			
ME (Kcal/kg)	3000	3000	3000
Crude protein (%)	21	23	25
Lysine (%)	1.1	1.1	1.1
Methionine (%)	0.6	0.6	0.6
Ca (%)	0.8	0.8	0.8
Available phosphorus	0.5	0.5	0.5
Fibre	4.0	4.0	4.0

2.2 Experimental Birds

Two hundred and ten (Ross 308) 4 weeks old chickens were used in the experiment. They were randomly divided into three treatment groups of 70 birds each. Each treatment was further divided into 7 replicates with ten chicks per replicate. Birds in each of the treatments T1, T2 and T3 were fed one of the experimental diets for four weeks. Feed and water were offered *ad-libitum*.

2.3 Data Collection

Feed and water intake was recorded daily. Body weight gain and ratio was monitored weekly.

2.4 Statistical Analysis

The data collected were subjected to analysis of variance (ANOVA) using the Stat View Statistical Package [6]. Treatment means were separated by Duncan multiple range test of the same package. The values were express as means and standard error of the mean.

3. RESULTS AND DISCUSSION

Initial live weights of the birds were 550.1, 588.2 and 648 g/b for T1, T2 and T3 respectively (*P*=0.05) (Table 1). The initial weights differed significantly because the birds were hitherto fed diets varying in protein levels (23, 25 and 27%CP for T1, T2 and T3 respectively). Thus, final body weight also increased 1,505 g/b for T1 to 1859g/b for T3 (*P*=0.05) (Table 2). Body weight gain also increased from 955 g/b T1 to 1211g/b for T3. Feed intake was however not significantly affected by the treatments, even though it increased slightly with increasing levels of protein in the diets i.e from 84 g/b/d for T1 88 g/b/d for T3 (Table 2. Water intake followed a similar pattern as it increased slightly (*P*=0.05) from 209 mls/b/d for T1 to 219 mls/b/d *(P=0.05)*. F.C.R (feed conversion ratio) was significantly (*P*=0.05) better for T3 (0.54) followed by T2 (0.59) and T1 (0.65). Mortality was similar across the treatment (4.3%) (*P*=0.05).

In broilers, growth rate and feed utilization efficiency is greatly influenced by dietary protein level. The result obtained in this study are similar to the earlier findings of Solangi et al. [7] who reported increases in body weights of broilers when the protein levels of the diets were increased from 17 (1, 402 g/b) to 26% (1, 867g/b). [8] also reported that weight gain was responsive to dietary protein levels.

Also reported that low CP levels in diets depressed body weight gain and feed intake (GFR) by 8 – 11% (*P*=0.05) [9]. Several authors [10,11] also concluded that the level of digestible protein in feed influences broiler weight gain.

Kamran et al. [12] examined the effects of low protein diets having constant energy – to – protein ratio on the performance of broiler finishers and reported that weight gain decreased linearly (*P*=0.05) whereas feed intake and feed conversion ratio increased (*P*=0.05) linearly as dietary protein and energy decreased.

These results are in agreement with the earlier work of Fetuga [13] who observed that an increase in protein level of the diet from 19 to 21 percent increased feed intake by broilers. This work is also in close agreement of Smith [14] who stated that an increase in protein level in the diet increase feed intake in broilers.

Similarly Olomu and Offiong [15], observed no significant effects of dietary protein levels on feed consumption when increased in broilers diets from 17 to 23 percent. This study shows better utilization of available nutrients in the feed with increased protein concentration. Bookholt et al. [16] postulated that weight gain is mainly deposition of fat, protein and water.

Water intake did not differ significantly between the treatments, even though it increased from (208.400 mls/b/d) for T1 to (219.316 mls/b/d) for T3. These values are in line with the observation

Table 2. Performance of broiler finishers diets containing different levels of protein

Parameters	Treatments			SEM
	T1(21% CP)	T2 (23%CP)	T3 (25%CP)	
Initial weight (g/b)	550.079^{b}	588.173^{b}	647.983^{a}	0.0005
Final body weight (g/b)	1504.777^{a}	1691.919^{b}	1858.999^{c}	0.0005
Body weight gain (g/b)	954.699^{a}	1103.764^{bc}	1211.016^{c}	0.0021
Total feed intake (g/b)	2349.048	2413.016	2473.33	0.0014
Feed intake (g/b/d)	83.897	86.179	88.33	0.0015
Total water intake (ml/b)	5863.190	5973.429	6140.857	0.0032
Water intake (ml/b/d)	208.400	213.337	219.316	0.0013
F.C.R	2.46^{a}	2.18^{b}	2.04^{c}	0.004
Mortality (%)	4.286	4.286	4.286	0.4753

^{abc} *Means in the same row followed by different superscripts are significantly different (P=0.05)*

that broilers would drink 2 g of water for each 1g of feed consumed [17]. Broilers in the different groups had comparable water intake, which is an indication that none of the dietary protein levels investigated in this study predisposed the birds to water stress. Besides, the birds were raised under the same environmental conditions, thus, eliminating the effect of environment on water consumption.

Mortality averaged 4.2% across the treatments (P>0.05), indicating that the various protein levels used did not affect livability of the birds. Oyede [18] also reported that varying CP levels in the diets of broilers did not affect livability.

4. CONCLUSION

It is concluded that feeding 25%CP at finisher phase positively influenced the performance of broiler finishers in the study area.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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