

EFFECTS OF ENERGY, PROTEIN AND THEIR INTERACTION ON GROWTH PARAMETERS OF NIGERIA INDIGENOUS GUINEA FOWL KEETS

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ABSTRACT

Growth in animal is determined by a complex variety of factors which can be reduced to three main factors – the animal's gene pool, the nutrients with which it is supplied, and its environment. This 10-week feeding trial was carried out to evaluate the effect of dietary energy, protein and their interaction on the growth performance of Nigerian indigenous guinea fowl keets. A total of one hundred and eight (108) brooded unsexed guinea fowls: A3x3 factorial layout (26, 24 and 22% dietary protein (%CP) while the energy levels were 2650, 2750 and 2850.00 Kcal/kgME) fitted in a completely randomized design was adopted for the study. Data were obtained on body weight gain, feed intake and feed conversion ratio. Data obtained were subjected to GLM procedure of SPSS statistical software to determine the fixed and interaction effects of the utilization of feed. Although the results indicated that dietary energy, protein and their interaction had no significant ($P>0.05$) effects on body weight gain, feed intake and feed conversion ratio, birds fed 22% CP and 2,650 Kcal/kgME seemed to have better numerical values. From the findings of this study, it is recommended that 22% CP and 2,650 Kcal/kgME inclusion levels should be used in guinea fowl production for better performance.

Keywords: Dietary Energy, Dietary Protein, Body weight gain, Feed intake, Feed conversion ratio

INTRODUCTION

Guinea fowl production in Nigeria is gradually gaining prominence (Obike, 2014). This witnessed popularity is because of their relished meat and egg, scavenging ability, utilization of feed and resistance to common chicken diseases (Naandam and Issah, 2012; Batkowska *et al.*, 2021; Yakubu *et al.*, 2022; Jegede *et al.*, 2025) as well as their ability to utilize marginal areas. The popularity may however be limited or short lived if deliberate efforts are not directed towards understanding their optimum nutritional requirements for growth and eggs performance. In communities where guinea fowls are fondly raised, they are allowed to scavenge freely; this practice will not reveal the true worth of the birds neither will it promote commercialization. However, like with chicken production, growth and nutritional development will accelerate production and commercialization of guinea fowls especially if their energy and protein requirements are known. Protein and energy play critical roles in the development of animals. They are needed to maintain health, growth, and production (Ahiwe *et al.*, 2018). While energy controls feed consumption, protein serves as building blocks for cells and aid repairs and maintenance of body cells and tissues. The utilization of commercial feed on guinea fowls keets have been investigated, however, there is a dearth of information on formulated feed that utilized locally accessed ingredients. This study, therefore, evaluated the utilization of dietary protein and energy by Nigerian indigenous guinea fowl keets.

MATERIALS AND METHODS

The experiment was carried out at the Guinea Fowls Improvement Unit of the Teaching and Research Farm, Landmark University, Omu-Aran, Kwara State, Nigeria under the 2019 TETFund National Research Grant for guinea fowls improvement in Nigeria. The research grant hosted in Guinea fowls' unit was co-managed by the University of Agriculture, Abeokuta and Nasarawa State University, Shabu-Lafia Campus, to facilitate the implementation of the 2019 TETFund National Research Grant for guinea fowl improvement. The study area lies within latitude 8° 8'00"N and longitude 5 ° 6'00"E, and 564 m above sea level (Elemile *et al.*, 2020). A total of one hundred and eight (108) brooded unsexed Nigerian indigenous guinea fowl keets were assigned to the dietary treatments in a 3x3 factorial layout (dietary protein: 26, 24 and 22% CP and dietary energy: 2650, 2750 and 2850.00 Kcal/kgME) fitted in a completely randomized design. Body weight gain, feed intake and feed conversion ratio were determined using sensitive electronic weighing scale. Data obtained were subjected to

general linear model (GLM) procedure to determine the fixed and interaction effects using IBM-SPSS version 27 (IBM-SPSS, 2020)

RESULTS AND DISCUSSION

Effect of graded dietary energy on average weekly body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR) of the Nigerian indigenous guinea fowl

Table 1 shows the effect of dietary energy on average weekly body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR) of the guinea fowls. From the result, variation of energy in the diet of guinea fowl keets did not significantly affect ($P>0.05$) their weight gain, amount of feed consumed and the utilization of the feed.

Table 1: Effect of dietary energy level on average weekly body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR) guinea fowl

Traits	E1 (2,650)	E2 (2,750)	E3 (2,850)	P-value
BWG(g)	363.88±15.57	363.93±15.57	362.89±15.57	0.999
FI (g)	584.46±4.89	581.99±4.89	578.23±4.89	0.663
FCR(g)	2.55±0.16	2.53±0.16	2.54±0.16	0.997

Means in a row do not differ significantly at $P>0.05$

Effect of graded dietary protein on average weekly body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR) of guinea fowl

The effect of graded dietary protein on average weekly body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR) of guinea fowls is shown in Table 2. The result revealed that, average weekly body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR) were all not significantly affected by the variation of protein level in the diet of the guinea fowl keets.

Table2: Effect of protein level on average weekly body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR) of the experimental birds

Traits	P1(26)	P2(24)	P3(22)	P-value
AWG(g)	360.19±15.58	367.62±15.58	362.89±15.58	0.943
FI (g)	582.58±4.89	587.08±4.89	575.03±4.89	0.214
FCR(g)	2.53±0.16	2.50±0.16	2.59±0.16	0.938

Means in a row do not differ significantly at $P>0.05$

Interaction effect of graded dietary energy × protein on average weekly body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR) of the Nigerian indigenous guinea fowl

Table 3 presents the Interaction effect of graded dietary energy × protein on average weekly body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR) of the Nigerian indigenous guinea fowl. The results show that average weekly body weight gain, feed consumption and utilization were not significantly ($P>0.05$) affected by the energy and protein interaction.

Table 3: Effect of energy level × protein level interaction on average weekly body weight gain(BWG)(g), feed intake (FI) and feed conversion ratio (FCR) of the experimental birds

E1(2,650)	Traits	P1 (26)	P2 (24)	P3(22)
	BWG	358.42±26.96	372.97±26.96	360.27±26.96
	FI	586.47±8.48	591.15±8.48	575.77±8.48
	FCR	2.62±0.28	2.43±0.28	2.59±0.28
E2(2,750)	BWG	362.25±26.96	366.73±26.96	362.82±26.96
	FI	592.60±8.48	584.68±8.48	580.62±8.48
	FCR	2.54±0.28	2.50±0.28	2.55±0.28
E3(2,850)	BWG	359.92±26.96	363.15±26.96	365.60±26.96
	FI	568.67±8.48	585.40±8.48	580.62±8.48
	FCR	2.44±0.28	2.58±0.28	2.62±0.28

BWG = body weight gain, FI = feed intake, FCR = feed conversion ratio, E = energy, P = protein

The non-significant effect of dietary protein, energy and their interaction on body weight gain, feed intake and feed conversion ratio of Nigerian Indigenous guinea fowl obtained in this study is similar to the report of Mandal *et al.* (1999). These authors reported that in guinea fowl keets, live weight gains during 0–12 weeks of age at different energy levels did not significantly differ. Also, Nahashon *et al.* (2007) reported that body weight and feed consumption did not vary significantly in guinea fowls fed with 2,800 and 2,900 kcal of ME/kg of diet, each

containing 14, 16, and 18% CP, respectively. However, Odukwe *et al.* (2020) found significant ($P<0.05$) energy x protein interaction effect for the average final weight with birds on 10.87MJ/kg x 15%CP as well as main effects for feed intake and weight gain. Both protein and energy are supposed to improve the palatability of feed which will in turn impact FCR and the BWG.

CONCLUSION

The results of this study indicated that dietary energy, protein and their interaction had no significant effects on body weight gain, feed intake and feed conversion ratio of Nigerian indigenous guinea fowl. Based on the current findings, however, it is recommended that 22% CP and 2,650 Kcal/kgME inclusion levels should be used in guinea fowl production for efficient and lower cost benefit on lower protein diet.

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