Continental J. Veterinary Sciences 2: 27 - 32, 2008

NUTRIENT DIGESTIBILITY, HAEMATOLOGY AND CARCASS EVALUATION OF INDIGENOUS WILD GUINEA FOWL (*NUMIDA MELEAGRIS GALEATA PALLAS*) FED GRADED LEVELS OF PROTEIN UNDER INTENSIVE MANAGEMENT.

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ABSTRACT

Nutrient digestibility, haematology and the carcass of indigenous wild guinea fowl reared under intensive management were evaluated for 20 weeks. The guinea fowl keets were randomly allotted to 4 treatments groups (designated as T_1, T_2, T_3 and T_4) of 2 replicates each. They were fed on a common starter diet containing 24%CP during the brooding period which lasted 8 weeks. After 8 weeks, the birds were fed diets containing 18%, 22%, 24% and 26%CP representing the various treatments. The keets fed the 24%CP diet were used as the control after the brooding period. Results show that the treatment significantly affected ($p<0.05$) dry matter (DM), crude protein (CP) and ether extract (EE) digestibility while crude fibre (CF) and Nitrogen free extract (NFE) digestibility were not affected ($p>0.05$) at the end of the experiment. The haematological indices measured were not affected ($p>0.05$) by the treatments. Evaluation of the cut-up parts of the carcass showed that the neck, drumstick, thigh, leg and head were not significantly affected ($p>0.05$) while the live weight, slaughtered weight, dressed weight, back, wing and breast were affected ($p<0.05$) by the treatment. It was concluded that feeding indigenous wild guinea fowls kept under intensive management graded levels of protein led to marked differences in their ability to utilize nutrients, their blood constitution as well as their carcass quality.

KEYWORDS: Nutrient digestibility, haematology, carcass, guinea fowl, graded level of protein, intensive management.

INTRODUCTION

Guinea fowl usually obtained from the wild are cherished and widely eaten by Nigerians mainly because of the distinctive flavour of both its meat and eggs (Ayeni and Ayanda, 1982; Okaeme, 1982). It is indigenous to West Africa mostly found north of the equatorial forest where they occupy the guinea savanna region. With an estimated population of 43 million in captivity in Nigeria (Ayeni, 1980) it represents a great potential as a source of meat and egg especially as the nation strive towards a speedy bridging of the protein deficiency inherent in its population. The bird is socially accepted and there is no religious taboo against its consumption. Its meat has a higher protein content (about 28%) compared to the 20% of the domestic fowl (Ayeni, 1980).

Guinea fowls are mostly kept under semi-intensive management. Ayeni (1980) opined that keets managed this way grow best on 20-24%CP diet and that it could be further reduced to 18%CP from the 8th week of age. Rearing guinea fowl commercially under semi-intensive management however exposes the keets to a lot of hazards. The intensive production of guinea fowls in Nigeria which is just beginning is likely to be accelerated as the birds' potential as an easy and quick grown source of meat and egg becomes more fully realized. Research into its biology and performance will provide opportunities for an increase in the commercial production of the bird (Ayorinde and Ayeni, 1983; Ayorinde and Okaeme, 1984). Most of the works carried out using guinea fowls are in the southern part of the country. There is a dearth of information therefore on how the birds will react to confinement in other parts of the country. This study was undertaken therefore to investigate the effect of feeding graded levels of protein on nutrient digestibility, haematology and carcass quality of indigenous wild guinea fowls reared under intensive management.

MATERIALS AND METHODS

The experiment which lasted 20 weeks was conducted in the poultry unit of the Department of Animal Production, School of Agriculture and Agricultural Technology of the Federal university of Technology Minna, Niger State, Nigeria. Minna lies within the southern guinea savanna area of Nigeria with an average annual rainfall of 1200mm.

Table 1: Dietary composition of experimental feed (%).

	Starter diet	Finisher diet			
		T_1	T_2	T_3	T_4
Ingredients	24	18	22	24	26
Maize	47.71	69.93	53.11	47.71	42.33
GNC	34.54	18.32	29.14	34.54	39.92
Rice bran	5.00	5.00	5.00	5.00	5.00
Fish meal	1.00	1.00	1.00	1.00	1.00
Blood meal	5.00	5.00	5.00	5.00	5.00
Oyster shell	2.50	2.50	2.50	2.50	2.50
Bone meal	3.50	3.50	3.50	3.50	3.50
Salt	0.50	0.50	0.50	0.50	0.50
Premix	0.25	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00	100.00
CP%	24.00	18.00	2.00	24.00	26.00
Energy (Kcal/kg)	3,100	3,100	3,100	3,100	3,100

Table 2: Average feed intake, body weight, body weight gain and feed Conversion efficiency of indigenous wild guinea fowl keets during brooding on starter diet.

Weeks	Average feed intake (g)	Average body weight (g)	Average body weight gain (g)	Feed conversion (%)
1	21.74	44.20	11.40	1.91
2	39.51	56.10	11.90	3.32
3	57.63	78.60	22.50	2.56
4	79.60	116.00	37.40	2.13
5	88.40	166.60	50.60	1.74
6	81.94	195.83	29.60	2.77
7	119.72	230.99	35.16	3.41
8	165.67	268.87	37.67	4.40

Source of feed and experimental diet

All the materials used for the experiment were sourced locally. These include: maize, groundnut cake (GNC), fish meal, bone meal, oyster shell; premixes were obtained from Pfizer feed. Four different isocaloric diets were formulated using these ingredients. These are a starter diet (with 24%CP) fed to all the keets from day old to 8 weeks and finisher diets made up of 18%, 22%, 24% and 26%CP respectively. The graded protein levels represent the different treatments. The compositions of the experimental diets are as shown in Table 1.

Housing

The birds were raised on deep litter. At 8 weeks, the birds were divided into 4 treatments with 2 replicates each in a completely randomized design. Prior to the arrival of the birds, the pens were cleaned, washed, disinfected and the floor covered with wood shavings. 60 watts bulbs were used to provide heat during brooding and subsequently as a source of light through out the remaining part of the trial. Chick feeders and drinkers were used for the first 4 weeks and thereafter changed to bigger ones. The partitioning of the pens was raised up to roof level using wire mesh because of the flighty nature of the wild guinea fowl. Feed and water were supplied *ad libitum* and appropriate medications given as of when due.

Table 3: Apparent nutrient digestibility by indigenous wild guinea fowls fed graded levels of protein.

	Dietary protein levels (%)				
	T_1	T_2	T_3	T_4	
Parameters	18	22	24	26	SD
Dry matter	54.33^{c}	59.24^{ab}	62.68^{b}	71.25^{a}	6.76*
Crude protein	30.69^{c}	38.09^{c}	47.16^{b}	61.06^{a}	2.32*
Crude fibre	48.75	50.55	57.76	52.43	4.74ns
Ether extract	92.33^{b}	94.42^{a}	93.81^{ab}	95.08^{a}	1.17*
Nitrogen free extract	97.99	94.33	98.46	96.82	2.92ns

Means denoted by different alphabets along the same row are significantly different ($p<0.05$), ns: not significant ($p>0.05$), SD: Standard deviation.

Table 4: Haematology values of indigenous wild guinea fowls fed graded levels of protein.

	Dietary protein levels (%)				
	T_1	T_2	T_3	T_4	
Parameters	18	22	24	26	SD
Total protein (g/100ml)	5.44	4.69	4.58	4.78	0.39ns
Albumin (g/100ml)	2.69	2.36	2.63	2.63	0.15ns
Globulin (g/100ml)	2.75	2.33	1.95	2.15	0.34ns
Glucose (g/100ml)	330.47	317.13	301.28	329.38	31.60ns

ns: not significant ($p>0.05$), SD: Standard deviation.

Digestibility trial

Two birds were selected from each treatment and used to carry out digestibility trial. Samples of faeces were collected from the birds in the metabolic cages after a 5 days adjustment period and stored in the refrigerator. These were later dried at 65^{0}C until a constant weight was achieved and used for laboratory analysis to ascertain the level of nutrient utilization by the birds.

Blood analysis

Blood sample (5 ml) was collected via the wing veins and used for haematological study. Glucose content was analyzed using the method of Jain (1986) while blood analyzer (model 6300 Ames Company USA) was used for the determination of plasma protein and albumin.

Carcass analysis

Two birds from each treatment were selected, slaughtered by severing the jugular vein, bled and used for carcass analysis.

Statistical analysis

Data collected during the study were statistically analyzed by the method of Steel and Torrie (1980) and means separated where significant differences exist by the method of Duncan (1955).

Table 5: Effect of feeding graded levels of protein on the cut-up parts of indigenous wild guinea.

	Dietary protein levels (%)				
	T_1	T_2	T_3	T_4	
Parameters	18	22	24	26	SD
Live weight (g)	566.0^c	672.5^a	695.0^b	781.0^a	88.45*
Percentages of live weight					
Slaughtered weight	97.69^a	97.32^a	96.69^b	97.79^a	0.56*
Dressed weight	73.32^b	76.25^a	77.33^a	75.15^a	1.71*
Back	13.84^c	14.43^b	16.72^a	15.54^a	1.27*
Drumstick	9.12	9.48	9.60	11.31	0.95ns
Neck	4.77	4.93	5.13	4.25	0.38ns
Wing	11.75^a	11.80^a	10.93^b	11.92^a	0.45*
Breast	19.06^c	22.65^b	24.52^a	22.44^b	2.25*
Thigh	11.08	11.64	11.75	12.06	0.41ns
Legs	3.75	3.33	3.16	3.03	0.31ns
Head	4.28	3.53	3.40	3.44	s0.42ns

Means denoted by different alphabets along the same row are significantly different ($p<0.05$).
ns: not significant ($p>0.05$), SD: Standard deviation.

RESULTS AND DISCUSSION

Table 2 shows the general performance of the guinea fowl keets from day old to 8 weeks of brooding. It shows that feed intake, body weight and body weight gain of the keets increased with age. The result of the feed conversion efficiency did not follow any specific trend.

Table 3 shows the apparent nutrient digestibility of the diets fed the birds. Dry matter, crude protein and ether extract digestibility were significantly elevated ($p<0.05$) as a result of feeding graded levels of protein to the wild guinea fowls. In all the parameters measured except Nitrogen free extract, the guinea fowls fed 18%CP diet had lower values compared to those fed the 22%, 24% and 26%CP diets. The lower value observed (the 18%CP diet) especially for dry matter digestibility is at variance with the findings of Obioha and Okonkwo (1983) who reported that dry matter digestibility is increased when lower levels of protein are fed to guinea fowls. This work shows that a direct relationship possibly exist between protein level and nutrient digestibility. All the birds were able to utilize the carbohydrate component of the diets to the same degree hence the non significant ($p>0.05$) nature of NFE digestibility. This agrees with Vogt and Stute (1994) who in their comparative study of the guinea fowl, found out that the birds utilize Nitrogen free extract and lignin components of feed better than the domestic fowl. The result obtained for ether extract and crude protein digestibility however agrees with the findings of Agwunubi (1984).

The result of the blood analysis is presented in Table 4. No significant effect ($p>0.05$) was noticed as a result of the feeding of graded levels of protein to the guinea fowls. The low serum total protein observed for birds fed 22%, 24% and 26%CP is indicative of the fact that dietary protein is better utilized at higher levels by guinea fowls. The range of value obtained in this study is not too different to that reported by Olowokurum *et al.* (1983) although in their own work, no feeding regime was used. The almost similar values observed for glucose reflects the similarity in the energy portion of the diets.

Table 5 shows the cut-up parts expressed as a percentage of live weight. The increase in the proportion of the cut-up parts obtained from birds fed 22%, 24% and 26%CP diets could be attributed to the tendency of the body parts to grow in proportion to body weights of the birds. The results shows that as the protein level increased in the diets, there was an increase in the ability of the guinea fowls to retain more of it in the form of muscle. This might be the reason why better weights were observed for the cut-up parts of guinea fowls fed 26%CP diet compared to those in the other treatment groups. The guinea fowls on slaughter in this trial had a dressing percentage of between 73.32-77.33% of edible parts which quite agrees with the range of 50-80% posited by Ayeni (1980).

CONCLUSION

The result of the study showed that indigenous wild guinea fowls respond to different levels of protein and the respond is positively related to the level of protein fed. The guinea fowls fed the 26%CP diet performed better in most of the parameters measured.

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Received for Publication: 03/06/2008
Accepted for Publication: 25/08/2008

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