

Growth response and carcass characteristics of broiler chickens on different daily feeding frequency

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Target Audience: Animal Scientists, Livestock farmers and Agricultural Extensionists

Abstract

A total of 99 day old broiler chicks were used in a 56 day trial to determine the growth response and carcass characteristics of broiler Chickens on different daily feeding frequency. They were randomly allotted into three treatment groups (T_1 , T_2 , T_3). T_1 were fed once a day, T_2 were fed twice a day while T_3 were fed thrice a day. All treatments were fed with the same quality and quantity of feed. Data obtained include; weight gain, feed intake, feed conversion ratio, and carcass traits of the broiler chickens. Results obtained revealed no significant ($P>0.05$) difference among the growth parameters observed except the final weight. Birds fed twice a day recorded the highest final weight (2295.50g) followed by those fed once a day (2236.30g) and thrice a day (2230.30g) respectively. No significant differences ($P>0.05$) among dietary treatments were observed on carcass parameters measured except the live weight, drumstick and heart. The live weight of the experimental animals ranged significantly from birds fed once a day (2366.67g) to those fed thrice a day (2783.30g). Birds fed twice a day and thrice a day had similar ($P>0.05$) drumstick values but significantly ($P<0.05$) higher than those fed once. Animals fed twice a day (0.58) recorded the highest heart weight followed by those fed once a day (0.45) and thrice a day (0.48) that was statistically similar. Based on the results of this study, it was concluded that birds fed frequently at least twice a day performed better compared with birds fed once a day.

Keywords: Feeding frequency, Performance, Carcass, Broiler Chicken.

Description of problems

Livestock production industry has been sustained for many years with the aim of establishing it, but this is yet to be fully achieved in most developing countries like Nigeria (1). The primary aim or purpose of livestock production is to produce inexpensive source of protein for human consumption (2). However, the success of the livestock industry depends on the amount of nutritional information available and appropriate management technique relevant to poultry farmers such as feeding and management. Apart from diet composition, feeding rate is an important step in feed strategy to determine the optimal frequency of feeding. (3) suggested

that poultry production should be increased more rapidly than the production of other livestock because birds have ability to convert their feed efficiently within a short period of time. Broiler have been considered efficient converter of poultry ration to edible meat attaining live weight of about 1.5-3.0kg between 6-10weeks of age depending on the feed quality and quantity, health and other management practice (4). The meat is rich in essential and non-essential amino acid required for growth. Broiler has a good carcass yield or dressing percentage and the efficiency of utilization is very high compared to other livestock. Animal protein is very important in human nutrition because it contains essential

amino acid required by man and likewise the required vitamins and minerals (5) Animal protein source like mutton is very expensive, whereas beef has a limited use because of its high cholesterol content, broiler meat may therefore help in bridging the gap between supply and demand of animal protein because of its high biological value, quickest and economical source of human food (6). Various methods of feed restriction such as intermittent feeding, frequency of feeding, skip a day feeding have one or more effect on performance of broiler production. This study therefore evaluated the effects of feeding frequency on the growth performance and carcass characteristics of broiler chickens.

Materials and Methods

Experimental Site

The experiment was carried out at Teaching and Research farm of the Federal College of Animal Health and Production Technology, Moor plantation, Ibadan. The area lies within the rain forest ecological zone, and falls within longitude and latitude $7^{\circ} 27'$ and $3^{\circ} 25'$ respectively at altitude 200- 300m above the sea level with an annual rainfall of about 1250mm. The temperature and relative humidity ranges from 30 – 35°C and 76 – 84% respectively. The experiment lasted for a period of 8 weeks.

Experimental Animals and their Management.

A total of ninety-nine (99) birds were used for this experiment they were distributed randomly into three (3) dietary treatments of three replicates containing eleven (11) birds. The birds were weighed at the commencement of the experiment to determine their initial weight and subsequently weighed on weekly basis until the experiment was completed. In treatment one (T_1), the birds were fed once daily (7am), birds in treatment two (T_2), were fed twice daily (7a.m and 12noon) while birds in treatment three (T_3) were fed thrice daily

(7am, 12noon and 5pm). The birds in each treatment were fed same quantity and quality of feed. Daily management of the experimental birds include weighing of the experimental feed of each replicate, cleaning of the feeding and water trough, inspection of the birds' excreta. Weekly management includes weighing of experimental birds of each replicates and occasional management includes vaccination and medication of the birds.

Experimental Design

A total of ninety-nine (99) birds used for this study were randomly allotted into three (3) dietary treatments of three replicates containing eleven (11) birds in a completely randomized design.

Chemical analysis

An aliquot of daily feed samples (concentrates) was collected, oven-dried, ground and sieved through a 2-mm sieve and stored in airtight container for proximate (8). Nitrogen Free Extract (NFE) was determined by subtracting sum of (%Moisture + % Crude Protein + % Ether extract + % Crude fibre + % Ash) from 100.

$$NFE = (100 - (\%M + \%CP + \%EE + \%CF + \%Ash))$$

Parameters Measured

Data were collected based on the following parameters:

- Feed consumption: This was obtained by weighing the quantity of feed served in gram and the next day, the leftover was weighed in order to know the quantity of feed consumed.
- Body weight gain: Birds were weighed every week before feed and water were given All birds in each replicate were weighed and average weight for each replicate was obtained by dividing the total weight of the birds by the number of birds in each replicate.

Feed Conversion Ratio: This was computed by dividing the daily feed intake by the daily weight gain.

$$FCR = \frac{\text{Feed intake (g)}}{\text{Body Weight gain (g)}}$$

Carcass Evaluation

At the end of the feeding trial, two (2) birds were randomly selected from each replicate at the end of the experiment for carcass evaluation. The birds were weighed,

stunned, bled and processed to obtain the dress weight, eviscerated weight while the organs and cut-up parts are expressed as percentages of the live weight.

Statistical Analysis

Data collected were subjected to one-way analysis of variance (9) and the means were separated using Duncan Multiple Range Test (10) using the statistical package (9).

Table 1: Gross composition (%) of Broiler Starter and Finisher Ration

Ingredients	Starter (%)	Finisher (%)
Maize	50.30	50.72
Soya bean	40.00	33.20
Bone meal	4.00	5.00
Osyter shell	2.00	2.50
Fish (72% CP)	3.00	3.00
*Premix	0.25	0.25
Salt (NaCl)	0.25	0.25
Methionine	0.10	0.15
Lysine	0.10	0.15
Total	100.00	100.00
Crude protein (%)	22.95	20.05
Crude fibre (%)	5.32	6.41
Metabolized Energy	2,782	2,910

* Starter premix contained vit A, 12000 i.u; vit D₃, 2000 i.u; vit E, 30mg; vit K, 2.5mg; vit B₂, 6mg; Nicotinic acid, 30mg cal.D-pentothenate, 15mg; vit B₆, 3mg; vit B₁₂, 0.02mg; manganese, 60mg; Iron, 80mg; Zinc, 40mg; copper, 8mg; iodine, 0.80mg; cobalt, 0.40mg and selenium 0.20mg.

*Finisher premix contained vit. A, 10000 i.u; vit.D₃, 1500 i.u; vit.E, 20mg; vit. K, 2.00mg; vit. B₂, 6.00mg; Nicotinic acid, 20mg; cal. D- pantothenate, 10mg; vit.B₆, 2.5mg; vit B₁₂, 0.01mg; manganese, 60mg; iron, 80mg; zinc, 40mg; copper, 8.00mg; iodine, 0.8mg; cobalt, 0.40mg and selenium, 0.20mg

Results and Discussion

Effects of daily frequency of feeding on the growth response of broiler chickens are presented in **Table 2**. There were no significant (P>0.05) difference in all the parameters observed except in final weight gain. The final weight gain values varied significantly (P<0.05) across the dietary treatments in which birds in T₂ (2295.50g) recorded the highest value followed by those in T₁ (2236.30g) and T₃ (2230.30g) respectively. Birds fed more frequently have higher values

for most of the parameters measured as can be observed in the final weight where birds in T₂ (twice/day) had higher value compared to T₁ (once/day). This result was in agreement with the findings of (7) who reported that broiler chicken fed twice daily performed better than those fed once daily. Similarly, birds fed twice daily (T₂) had a higher value of the final weight. The same trend was followed by the weight gain and feed conversion ratio which shows the best value in T₂ (2.42). The results further revealed that the parameters considered

such as initial weight, weight gain, daily weight gain, daily feed intake, protein efficiency and percentage mortality were not different across the treatment. However, the final weight was significantly different across the dietary treatment having its highest value of 2295.50g in T₂ that was fed twice daily and the lowest value of (2230.30g) in T₃ which was fed thrice daily. The lowest mortality was

recorded in T₂ (0.00%). This was in agreement with the report of (11) who reported the more frequent poultry birds are fed a day, the more the rate of converting the feed to flesh. The lowest mortality recorded in T₂ compared to other treatments could not be explained as all birds were subjected to the same experimental condition.

Table 2: Effects of daily frequency of feeding on the growth response of broiler chickens

Parameters	T ₁	T ₂	T ₃	SEM
Initial weight (g)	44.23	45.37	46.40	0.54
Final weight (g)	2236.30 ^{ab}	2295.50 ^a	2230.30 ^b	13.7
Weight gain (g)	2219.10	2183.40	2183.90	23.14
Daily weight gain (g/d)	39.63	38.99	39.00	0.41
Daily feed intake (g/d)	101.87	93.97	100.20	2.63
Feed conversion ratio	2.57	2.42	2.57	0.06
Daily protein intake (g/d)	21.90	20.23	21.53	0.56
Protein efficiency	1.81	1.95	1.81	0.06
Mortality (%)	6.06	0.00	6.05	0.35

^{a, b, c} means with same superscript along the row are not significantly different (P>0.05)

T₁: Birds fed once daily at 7am,

T₂: Birds fed twice daily at 7am and 12noon.

T₃: Birds fed thrice daily at 7am, 12noon and 5pm.

Presented in **Table 3** is the effect of daily feeding frequency on the carcass characteristics of broiler chickens. The results revealed that there were no significant (P>0.05) differences across the treatments for dressed weight, eviscerated weight, head, shank, neck and gizzard. Live weight had the highest value (2783.30g) in T₃ while the least value (2366.67g) was obtained in T₁. The highest percentage for leg was observed in T₂ (2.49%) which showed no significant (P>0.05) when compared to birds in T₁ and T₃. The result further revealed that the highest value for drumstick in T₂ and T₃ were 10.56% and 10.95% of the live weight of the birds. The non

significant of most of the parameters measured was corroborated by the report (12) that nutrition, age, sex, environment, stage of development and efficiency of feeding were identified as major determinants for carcass quality. The highest values of live and dressed weight observed in T₃ and the least observed in T₁ supported the findings that birds fed more than once a day perform better than those fed less frequently (13). Similarly, the results obtained from this study corroborated the report that says feeding birds more frequently can improve feed efficiency and nutrient utilization thereby reducing prolonged rearing of broiler chickens (14).

Table 3: Effects of daily feeding frequency on the carcass characteristics of broiler chickens

Parameters	T ₁	T ₂	T ₃	SEM
Live weight (g)	2366.67 ^c	26600.00 ^b	2783.30 ^a	118.70
Dress weight (g)	2050.00	2216.70	21833.30	58.78
Eviscerated Weight (g)	2000.00	2166.70	2116.70	88.78
Cut-up parts expressed as % of Live weight				
Head	3.25	3.26	3.00	0.13
Leg	2.19	2.49	2.02	0.08
Shank	1.10	1.05	1.05	0.04
Drumstick	8.95 ^b	10.56 ^a	10.95 ^a	0.36
Neck	2.45	3.14	2.68	0.15
Gizzard	2.33	2.45	2.43	0.08
Heart	0.45 ^b	0.58 ^a	0.48 ^b	0.02

^{a, b, c} means with same superscript along the row are not significantly different (p>0.05)

T₁: Birds fed once daily at 7am,

T₂: Birds fed twice daily at 7am and 12noon.

T₃: Birds fed thrice daily at 7am, 12noon and 5pm.

Conclusion and application

Based on the results of this study, it can be concluded that:

- Feeding birds more frequently have no significant effect on the growth performance
- Feeding more than once in a day has been observed to reduce feed wastage thereby making more feed available for the birds
- Birds should be fed frequently at least twice daily for better feed utilization and reduction of wastage.

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