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Performance of Broilers Raised on Variants of the Three- Phase Feeding Regimes

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Abstract

The performance of broilers raised on the three-phase feeding regimes in a fifty-six days production period was studied. The experiment was arranged in a Completely Randomized Design (CRD) design consisting of four groups of twenty-four birds each. The groups were randomly assigned a control (T1) feeding regime (0 - 28 day starter and 29 - 56 day finisher) and variants of the three-phase feeding regime as follows; T2 (0 - 7 days starter, 8 - 21 days grower and 22 - 56 days finisher); T3 (0 - 14 days starter, 15-35 days grower and 36-56 days finisher) and T4 (0 - 21 days starter, 22-35 days grower, and 36-56 days finisher). Results showed that the highest feed intake (5826.30 g) and final body weight (2689.40 g) were attained by the birds in T4, which were significantly ($p<0.05$) higher than the values (2649.10 g and 5672.88 g, respectively) recorded for birds in the control (T1) group. Feed cost (₦/kg) was significantly ($p<0.05$) higher (₦159.00) in T1 (control) than other groups (₦154.00). Birds on the control (T1) recorded significantly ($p<0.05$) higher feed cost/kg body weight (₦346.62) than other groups except for T4. Birds on the three-phase feeding regimes (T2, T3, T4) produced superior final body weight, body weight gain and feed cost per/kg body weight gain than the control (T1). Net income of broilers was highest in T2 which correspondingly produced the highest estimated profit. It is recommended that broilers that will be sold on weight basis could be more profitably produced on T2, a three-phase feeding regime with 0 - 7 days starter, 8-21 days grower and 22-56 days finisher diets.

Keywords: Broilers, three phase, feeding, regime.

Introduction

The feeding regime for commercial broiler strains worldwide includes four-phase feeding regime, three-phase feeding regime, and two-phase feeding regime. These are done in several production periods ranging from 36-56 days and in some cases 72 days, (Mehmood *et al.*, 2014). These phase feeding regimes are adapted to take advantage of the changes in the nutrient requirements of broilers at various stages of growth.

The dual phase feeding regime which is mostly practiced in Nigeria sometimes includes an extended period of high protein feeding. The three-phase feeding regime which includes: starter, grower and finisher diets appear to offer an opportunity to further reduce the cost of feeding of broilers. There is also the need to determine the appropriate time of change from starter to the grower and to the finisher.

This study, therefore, determined the variant of the three-phase feeding regimes with the optimum performance and net income of broilers raised in a fifty-six days (8 weeks) production period.

Materials and Methods

The ninety-six (96), day-old unsexed Arbor Acre broiler chicks were divided into four (4) groups (T1, T2, T3, T4) of twenty-four (24) birds each. Each group was further subdivided into three replicates of eight (8) birds each on an equal weight basis. The groups were thereafter, randomly assigned to three variants of the three-phase feeding regime and the control (T1) (Table 1) in a completely randomized design (CRD) experiment.

Table 1: Variants of the three-phase feeding regime representing the treatment groups

Diets	Treatments (Feeding duration)			
	T1	T2	T3	T4
Broiler starter	0-28 days	0-7 days	0-14 days	0-21 days
Broiler grower	-	8-21 days	15-35 days	22-35 days
Broiler finisher	29-56 days	22-56 days	36-56 days	36-56 days

Feed (Table 2) and water were offered at *ad libitum*, brooding was done by the use of charcoal stoves and lanterns. The recommended vaccination and medication schedules were followed in all the treatment groups. The feeding trial lasted fifty-six (56) days.

Table 2: Gross and calculated nutrient composition of experimental broiler diets.

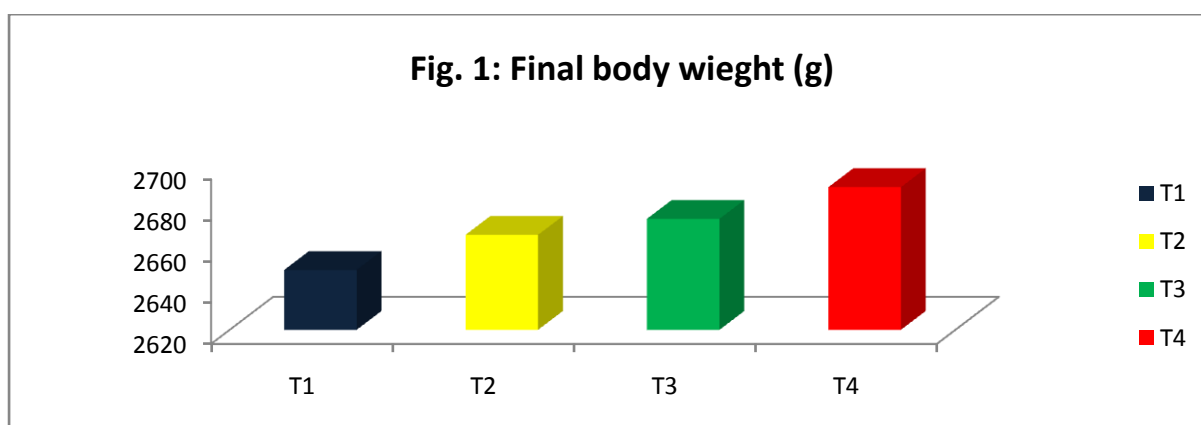
Ingredient	Starter	Grower	Finisher
Maize	51.00	55.00	60.00
Soybeans meal	31.45	20.00	22.00
Others*	17.55	25.00	18.00
Total	100.00	100.00	100.00
Calculated nutrients of experimental broiler diets (%)			
Crude Protein (%)	23.14	20.14	18.80
ME (Kcal/kg)	2974.82	2823.14	2994.60

*All diets contained the following ingredients: Palm kernel cake, Fish meal, Bone meal, Salt, vitamin/Mineral premix, Lysine and Methionine

Means of data obtained were subjected to Analysis of Variance and where significant differences were observed, the means were separated and using the Duncan's Multiple Range Test (Snedecor and Cochran, 1975) using R-Core Team (2012).

Results and Discussion

Final Body Weight and Body Weight Gain: The final body weight per bird at 56 days was between 2649.10 g and 2689.40 g, with birds on T4 recording the highest final body weight and those on the T1 recording the least final body weight (Fig. 1). The body weight gain of birds on T2 was significantly ($p < 0.05$) lower than those on T4 but similar ($p > 0.05$) to those on T2 and T3. However, birds on T1 (control) recorded the least final body weight and body weight gain (Table 3). These results are in line with reports by Skinner *et al.* (2001), Warma and Emmert (2000), Pope and Emmert (2001) and Roush (2004). That the highest amount of feed and nutrients were consumed during the grower and finisher periods, thus having a greater impact on body weight gain and feed utilization during the later phases of the growth period.

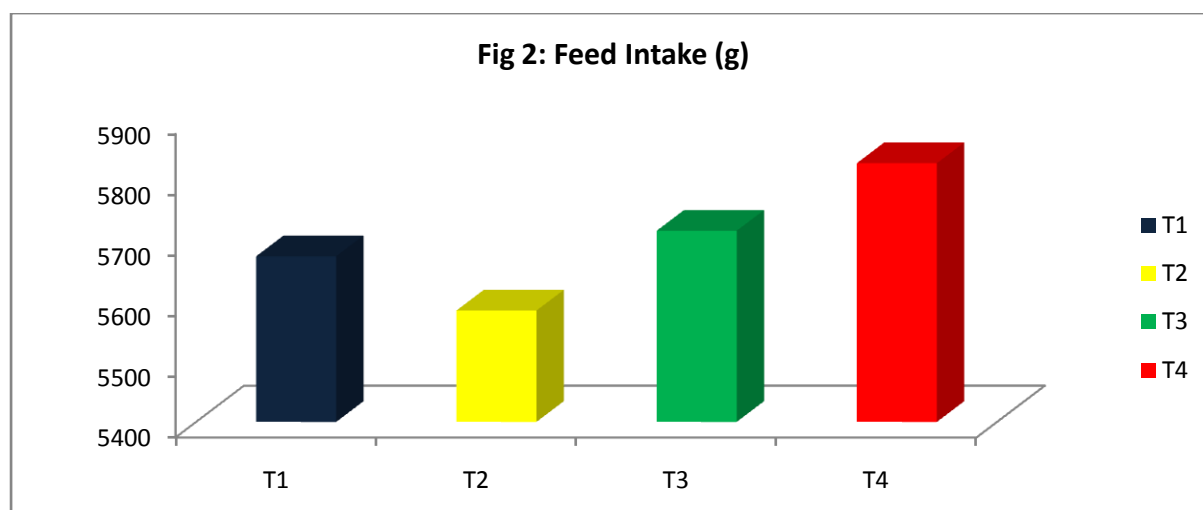


Feed intake: Feed intake increased with increasing days of broiler starter feeding among birds on the three-phase feeding regime (Table 3). However, birds on the T2 (0 - 7 days starter) recorded the least value for feed intake/bird (5583.44 g/bird), similar ($p > 0.05$) to the feed intake obtained for birds on the control (T1). The highest feed consumption was obtained by the birds on T4. The longer broiler starter feeding period in T4 (0 - 21 days) in the three-phase feeding regime might have contributed to the increased feed intake by broilers in view of the lower ME of starter diets. (Mbajorgu *et al.*, 2011). These effects were clearly marked in the work of Warma and Emmert (2000) and Skinner *et al.* (2001) and Roush (2004).

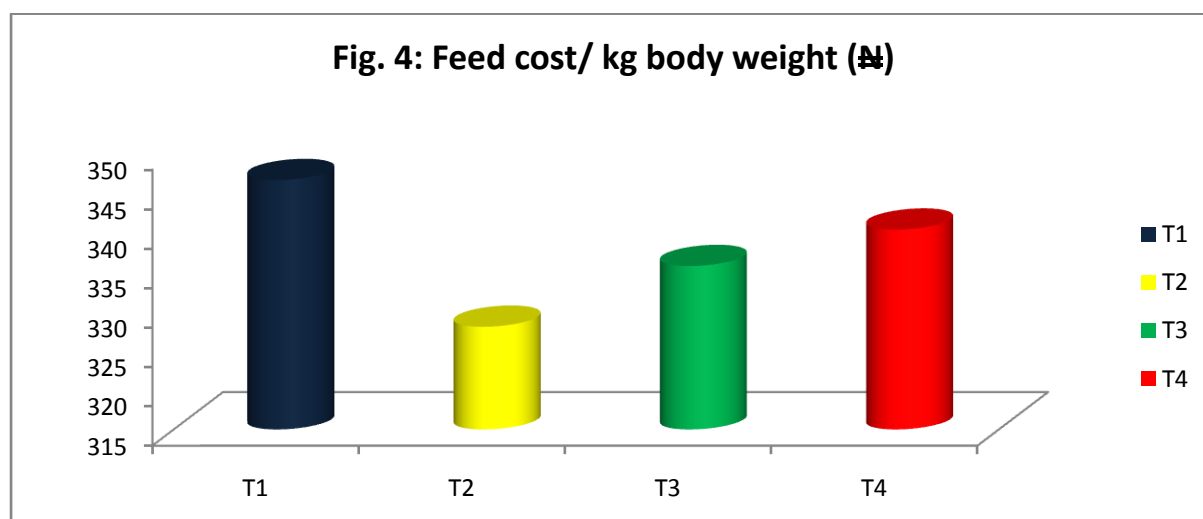
Table 3: Performance of the broilers on variants of three-phase feeding regime

Parameters	Treatments (Feeding duration)				SEM
	T1(Control)	T2	T3	T4	
Body weight gain (g)	2599.80 ^a	2616.80 ^{bc}	2624.40 ^{bc}	2640.30 ^c	13.414
Feed intake (g/bird)	5672.88 ^{bc}	5583.44 ^c	5714.91 ^b	5826.30 ^a	29.224
Feed conversion ratio (g feed/g weight)	2.18 ^a	2.13 ^b	2.18 ^a	2.21 ^a	0.010
Feed cost / kg (₦)	159.00	154.00	154.00	154.00	
Mortality (%)	12.50	8.33	8.33	4.2	

^{abc}: Means within a row with different superscript differ significantly ($p < 0.05$)



Feed Conversion Ratio: The best feed conversion ratio (2.13) was recorded among birds in T2 and the poorest (2.21) in T4. The amount of feed consumed during the first three weeks was only a small fraction of the total feed consumed by the birds over the 8 weeks growth period. Consequently, the highest amount of feed and nutrients were consumed during the grower and finisher periods, thus having a greater impact on body weight gain and feed utilization during the later phases of the growth period. These effects were clearly marked in the work of Skinner *et al.* (2001) and Rouch (2004).



Net income of broilers raised on variants of three-phase regime: The total input cost per bird was deducted from revenue per bird and the net income per bird for Treatments 1, 2, 3 and 4 were ₦1019.24, ₦1057.07, ₦1032.15, and ₦1026.26, respectively. The results are in line with the report of Oyediji *et al.* (2005) who stressed that feeding varying levels of protein and energy will positively impact liveability and increase the live weight of broilers, which will consequently result in profitability of broiler farming.

Table 4: Net income of broilers raised on variants of three-phase feeding regime

Parameters	Feeding Regimes and durations				SEM
	T1(control)	T2	T3	T4	
Input cost (₦/bird) (A)	1480.91	1459.16	1481.41	1501.78	
Revenue per bird (₦/bird) (B)	2490.15	2506.23	2513.56	2528.04	13.01
Net income (B-A)	1019.24	1057.07	1032.15	1026.26	6.20
Estimated profitability (%)	69.29	72.94	69.67	68.34	0.084

abc: Means within a row with different superscript differ significantly ($p < 0.05$)

Conclusion and recommendation

The three-phase feeding regime produced superior final body weight, and feed cost per/kg body weight gain, lower feed cost and similar feed conversion ratio than the control (T1). Net income of broilers was higher in T4. Birds on T2, 0 - 7 days starter, 8 - 21 days grower and 22 - 56 days finisher diets produced the best performance in terms of feed conversion ratio (FCR) and feed cost/kg body weight gain and net income parameters measured.

It is recommended that farmers that are interested in the targeted weight of broilers should adopt the three-phase feeding regime, particularly T2.

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