AMM -1

Performance of Broilers Raised on Dual and Triple Phase Feeding Regimes in an Open-Sided Poultry House

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Abstract
Performance of broilers raised under different multi-phase feeding regimes in the open-sided poultry house. One hundred and twenty day-old, Arbor-acre® broilers were divided into five groups of 24 birds each and each group replicated three times on weight equalization basis. Each group was assigned in a completely randomized design (CRD) experiment to one of the following multi-phase broiler feeding regimes; T1 [(control), starter 0-28 days, finisher, 29 - 56 days]; T2 [starter, 0-35days, finisher, 36-56 days]; T3 [starter, 0-21 days, finisher, 22-56days];T4 [starter, 0-7 days, grower, 8- 21 days, finisher, 22-56 days];T5 [starter, 0-21days, grower, 22-35days, finisher, 36-56 days]. Feed and water were offered *ad libitum* and the study lasted 56days.Results indicated that broilers on treatment T2 recorded significantly ($p<0.05$) higher final body weight, body weight gain and lower feed intake and better feed conversion ratio than those in other groups. Birds on diets T2 recorded the best (2.22) feed conversion ratio, lowest feed cost per kg body weight gain (₦325.45) and least input cost (₦1513.64). Net income was similarly, significantly ($p<0.05$) higher (₦1014.10) among broilers in T2 than other groups. It appears that in the dual phase feeding regimes (T1, T2 and T3), the longer the feeding duration of starter ration, the better the production parameters while the triple-phase feeding regime (T4 and T5) indicated similar ($p<0.05$) performance irrespective of the feeding duration of the three feed types. It is recommended that a longer starter feeding period as represented in T2 (0 – 35days) of the dual phase feeding regime be adopted when broilers are raised in the open sided poultry house.

Keywords: Broilers, feeding regime, open sided house,

Introduction

Feeding regime is a strategy adopted in poultry production to enhance performance. Pope and Emmert (2001) reported that multi-phase feeding is advantageous in improving feed efficiency and reducing diet cost. Also, Nasril (2003) reported that intensive multi-phase feeding improved body weight gain and feed- to- gain ratio only in weeks 5 and 6, but not during the overall seven- week feeding period. Similarly, sequential feeding of feeds with different nutritional values has been reported to effectively reduce mortality too (De Basilio *et al.,* 2001). There is therefore, the need to evaluate broiler performance in Nigeria under different phase feeding regimes, which would make them compete in the global poultry market. There is also the need for studies to evaluate the effectiveness of feeding regimes which will bring about optimum profit margins considering also the prevalent open-sided housing system that is used by most farmers in Nigeria.

This study was designed therefore to determine the performance and profitability of broilers raised on different feeding regimes in the prevalent open-sided poultry house.

Materials and Methods

The experimental broiler starter mash, broiler grower mash and broiler finisher mash are presented in table 1. One hundred and twenty (120), day-old (Arbor-acre) broiler birds were divided into five groups of 24 birds each and three replicates of 8 birds per group. Each replicate was housed in a compartment measuring 1.65 x 1m in an open-sided poultry house. The experimental broiler groups (T1 – T5) as shown in table 2 were assigned to the experimental broiler diets in a completely randomized design (CRD) experiment

The feed and water were offered *ad libitum*, the recommended vaccination and medication schedules were followed in all the treatment groups. The trial lasted for 56 days. Means of data obtained were subjected to analysis of variance (ANOVA). Where significant effects were observed, the means were separated by Duncan New Multiple Range Test (DNMRT) according to Snedecor and Cochran (1975).

Results and Discussion

Birds on treatment T_2 (dual feeding regime) produced the highest final body weight and body weight gain and the values were significantly higher than those obtained for birds in T_3, $T_4$and T_5 (Table 3). It does appear that broilers fed over a long period on starter mash produced higher body weight. Irrespective of the

feeding regime, the body weight gain of broilers increased with increasing duration of feeding higher protein diet. Body weight gain therefore, appeared to respond more to the duration of feeding certain types of diets than the feeding regime and followed a consistent trend on a weekly basis (Figure I) (Pope *et al*., 2002).

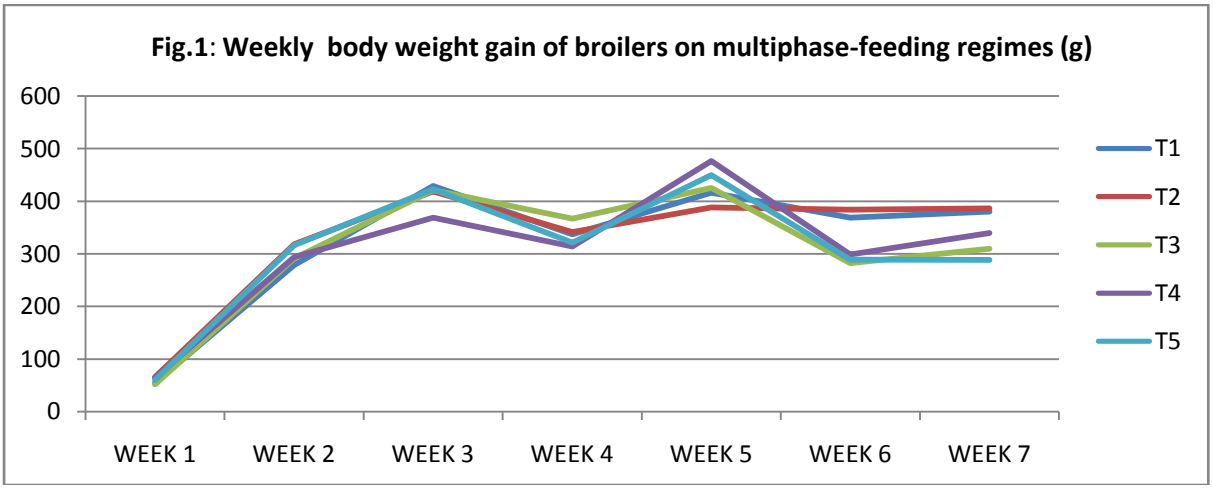
Table 1: Gross and calculated nutrient composition of experimental broiler diets

Ingredients	Experimental broiler diets (%)		
	Starter	Grower	Finisher
Maize	51.00	55.00	60.00
Soyabean meal	31.45	20.00	22.00
Palm kernel cake	12.00	18.20	11.95
Others*	5.55	7.00	6.05
Total	100.00	100.00	100.00
Calculated nutrient composition of experimental diet (%)			
Metabolisable energy (Kcal/kg)	2974.82	2923.55	2984.60
Crude protein	23.14	20.14	18.80

All diets contained the following ingredients: Fish meal, Bone meal, Salt, Vitamin/Mineral premix, Lysine and Methionine

Table 2: Variants of the dual-phase and triple phase feeding regimes

Treatments	Feeding phase and duration (days)		
	Starter (Days)	Grower (Days)	Finisher (Days)
T1 (Control)	0 – 28	-	29 – 56
T2	0 – 35	-	36 – 56
T3	0 – 21	-	22 – 56
T4	0 – 7	8 – 21	22 – 56
T5	0 – 21	22 – 35	36 – 56

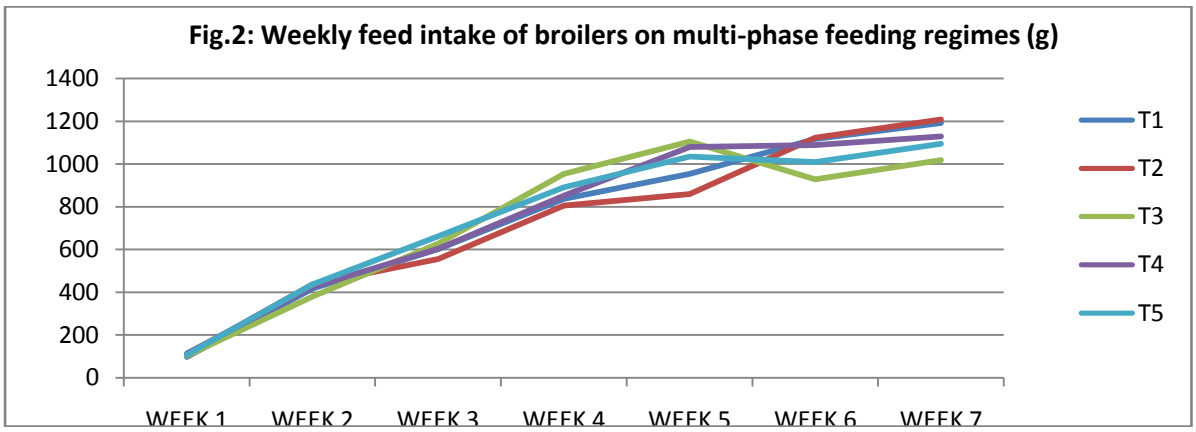


Total feed intake of broilers in this study ranged from 5090.00g to 5240.00g with birds on treatment T_2 recorded the lowest value (Table 3). Birds on T2 maintain consistently lower feed intake up to week 6. (Figure II). Birds on treatment T_3 and T_4 (triple phase feeding regimes) recorded significantly ($p<0.05$) higher feed intake than those on T_2 and T_3 (dual phase feeding regime). This result is at variance with the report of Saddiqi *et al* (1992) who reported no significant difference in feed consumption of broilers due to feeding regimes. Feed intake of broilers on treatments T_1, $T_4$and $T_5$was however, similar ($p>0.05$).

Broilers on T2 recorded the best (2.22) feed conversion ratio. This value was significantly ($p<0.05$) better than values obtained for other groups (Table 3). Birds on T_4 and T_5 produced poorer FCR than other groups. The result of this study agrees with the report of Artwell and Edmore (2015) who observed that birds in the triple phase feeding regime had poorer feed conversion ratio than those on the dual phase feeding regime. FCR decline was more in week 5 perhaps due to change in feed type (Figure III).

Birds on the treatment (T_2) produced significantly ($p<0.05$) lower feed cost per kg body weight gain than birds in other groups (Table 4.1).The ₦338.65 recorded for broilers on the control group (T_1) was significantly

($p<0.05$) lower than values obtained for birds on T_3, $T_4$and T_5. Watkins *et al.* (1993) observed that feeding broilers with growers after 14-17 days of age and then finisher mash up till 45 day did not affect performance. However, the result obtained in this study did not appear to agree with this finding as body weight gain increased with duration of feeding starter ration leading to a reduction in the cost of feed per kg body weight gain.



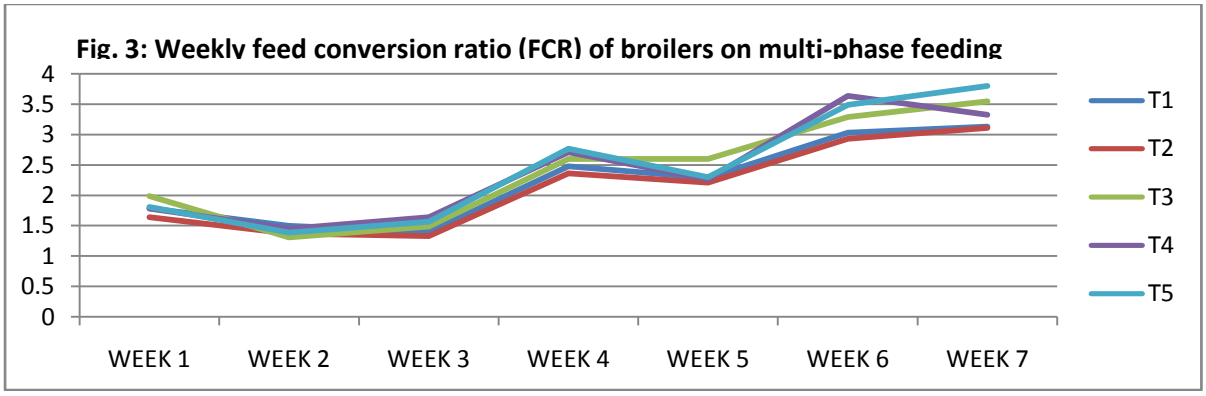


Table 3: Performance of broilers raised on dual and triple phase feeding regimes

Parameters	T1	T2	T3	T4	T5	SEM
Final body weight (g/bird)	2306.67^{a}	2340.50^{a}	2188.72^{b}	2196.58^{b}	2188.17^{b}	29.44
Body weight gain (g/bird)	2267.33^{ab}	2301.83^{a}	2149.72^{b}	2158. 25^{b}	2149.17^{b}	26.88
Feed intake (g/bird)	5220.00^{ab}	5090.00^{c}	5197.00^{bc}	5294.00^{a}	5240.00^{ab}	30.07
Feed Conversion Ratio	2.31^{ab}	2.22^{a}	2.43^{b}	2.47^{b}	2.45^{b}	0.04
Feed Cost (₦/kg)	146.60	146.60	146.60	143.53	143.53	
Feed cost/kg body weight gain (₦)	338.65^{a}	325.45^{b}	356.24^{c}	354.52^{c}	351.65^{c}	2.47
Mortality (%)	8.33	0.00	4.16	4.16	0.00	

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

Table 4 shows the net income of broilers under the dual and triple phase feeding regimes. Roush *et al*. (2004) reported that, in a phase feeding using starter, grower and finisher mashes, production variables were not sensitive to the grower diet. Oyedeji *et al*. (2005) stressed that feeding regimes impact livability which consequently impactnumber of birds available for sales and thus profitability of broiler farming.

Table 4: Net income of broilers under two-phase and three-phase feeding regimes

Parameters	Treatments(Dual and triple phase feeding regimes					SEM
	T1 (control)	T2	T3	T4	T5	
Input cost (₦/bird) (A)	1523.93	1513.64	1516.73	1515.70	1515.08	19.78^{ns}

Revenue per bird(₦/bird) (B)	2491.20[a]	2527.74[a]	2363.82[b]	2372.31[b]	2363.22[b]	31.78
Net income (B-A)	967.27[a]	1014.10[a]	847.09[b]	856.61[b]	848.14[b]	20.69

[abc]: Means with different superscripts within a row are significantly different ($p<0.05$). *Capital input cost was discounted.

Conclusion and Recommendations

This study has been able to establish thatFeeding broilers for a longer period on starter mash produced a better feed conversion ratio, lower feed cost per kg body weight gain and feed intake and higher estimated profit. The 0 – 35 day starter and 36 – 56 day finisher dual feeding regime produced the optimal profit in a 56 day production operation. However, only broilers that will be sold on live weight basis should be produced on a minimum of 35 days starter diet in the dual phase feeding system to guarantee maximum final body weights and body weight gain. Also, broilers could be raised at a slightly cheaper rate in the triple phase feeding regimes if the objective is to produce lower weight broilers.

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