AN APPRAISAL OF THE PERFORMANCE OF WEANER AND GROWER PIGS FED FROM DIFFERENT FEEDING TROUGHS: CONCRETE FEEDING TROUGH, SEMI-AUTOMATIC FEEDER AND THEIR COMBINATION

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Abstract

Performance of weaned and growing pigs fed from concrete feeding trough, semi-automatic feeder and its combination was examined for eight weeks. Sixty weaned cross bred (Large white × Landrace) pigs of average initial weight of 9.04 ±0.31 kg were used for the weaner phase. The animals were distributed into three treatments (T1; concrete feeding trough, T2: concrete feeding trough and semi-automatic feeder and T3; semi-automatic feeder), with four replicates of five pigs per replicate. Ninety growing pigs with average initial weight of 18.19±0.31 kg were allocated to three experimental treatments with five replicates of six pigs per replicate. The experimental design was completely randomized design. Feed and water were supplied unrestrictedly. Weekly feed intake and weight were monitored. Performance and economic variables were evaluated. There was no significant (P>0.05) effect of different feeders on all the performance and economic variables across the treatments for the weaner phase. The total cost of feeding (₦) ranged from 7170.4 to 7687.80. During the growing phase, the average daily weight gain (g) ranged from 428.57 to 448.74. The highest and lowest average daily weight gain was observed in pigs fed from the combined feeders and the semi-automatic feeder respectively. The total cost of feeding (₦) and average cost of feed per day (₦) were significantly (P<0.05) different among the treatments. The pigs that fed from the combined feeders (T2) had highest total cost of feeding (₦) while the total cost of feeding for the pigs that fed from concrete feeding trough (T1) and semi-automatic feeder were comparable.

Keywords: Concrete feeding trough, Semi-automatic feeder, Performance, Weaner and grower pigs,

Introduction

The quest for strategies to address the issue of body weight variability among pigs of the same age has gained attention recently in pig industry. The use of strategies that are commercially relevant, easy to implement and acceptable, such as feeder space and feeding management are among those strategies (López-Vergé *et al.*, 2018). Feeder space and design has been considered to be one of the possible ways to reduce body weight variability experience in pig production. Feeder has been described as a tool used for pigs to correctly access the diets (Gonyou and Lou, 2000) and act as the interface used for pigs to potentially meet their maximum growth. Feed intake is essential for a correct performance. Limiting feed intake due to poor access to feed directly affects growth potential and affects metabolism and health status in pigs (Dong and Pluske, 2007). Therefore, a correct access to feed is fundamental to allow pigs to meet their nutrient requirements (Gonyou and Lou, 2000). Quite a number of feeders for pigs have been identified in the market, and all of them were designed for similar goals; to maximize feed intake and minimizing feed wastage in order to optimize pig performance. The feeder, then, may affect the performance, growth and homogeneity of pigs (López-Vergé *et al.*, 2018). Therefore, the objective of this study was to evaluate effect of different feeders on growth performance and economic analysis of weaned and growing pigs.

Materials and methods

The experiment was conducted at AK Research farms located at Eleyele, Ibadan, Oyo state, Nigeria and it lasted for 56 days. Two studies were run concurrently using weaner and grower pigs. Experimental diets (Table 1) were formulated using the nutrient requirement recommendations of National Research Council (1998) for weaned and growing pigs. Sixty weaned cross bred (Large white × Landrace) pigs of average initial weight of 9.04 ±0.31 kg were used. The animals were distributed into three treatments (T1; concrete feeding trough, T2: concrete feeding trough and semi-automatic feeder and T3; semi-automatic feeder as shown in Figures 1-3), with four replicates of five

pigs per replicate. Ninety growing pigs with average initial weight of of 18.19±0.31 kg were allocated to three experimental treatments (as in the weaner study) with five replicates of six pigs per replicate. The experimental design was completely randomized design. The pigs were kept in Pens (234cm L × 216cm W) which had concrete floors with no litter in groups (same sex) based on body weight. Each pen had a concrete feeder (97cm L × 33cm W) and a concrete drinker (97cm L × 33cm W)**.** Semi-automatic feeder used had a guard that prevents feed wastage by the animals and provided a total of 56.0cm. × 25.0cm. (length × width) of trough space per feeder. All pigs in weaner and grower phases were fed a common weaner and grower diets respectively. Pigs were allowed *ad libitum* access to the diets and water served in concrete watering trough. Data were collected on daily feed intake and body weight gain. Daily weight gain, feed conversion ratio and indices for economic analysis were evaluated. All the data were subjected to analysis of variance using General Linear Model of SAS (2002) and the means were separated using Duncan Multiple Range test.

Results and Discussion

The growth performance and economic analysis of both weaner and growing pigs fed from different feeding troughs are presented in Table 2. There was no significant (P>0.05) effect of different feeders on final weight, daily weight gain, average daily feed intake and feed conversion ratios across the treatments for the weaner phase. The final weight (kg) ranged from 27.32 to 29.35 with the pigs that fed from concrete feeding trough (T1) and the combined troughs (T2) having the lowest and highest respectively. The pigs fed from both feeders had improved daily weight gain (369.71 g) and best feed conversion ratio (2.99). The highest feed intake (1021.14 g) was also observed in pigs fed from the combined feeders (T2). The economic analysis showed no significant (P>0.05) difference among the variables measured. The total cost of feeding (₦) ranged from 7170.4 to 7687.80. The pigs that fed from the combined feeders (T2) had the highest total cost of feeding while the lowest was observed in pigs that fed from concrete feeding trough (T1). The feed cost/Kg live weight gain (₦/Kg) ranged from 401.99 to 444.14. The best feed cost/Kg live weight gain (401.99 ₦/Kg) was observed in pigs fed from combined feeders while the worst feed cost/Kg live weight gain (444.14 ₦/Kg) was observed in pigs fed from semi-automatic feeder. During the growing phase, no significant (P>0.05) difference was observed in all the performance parameters except average daily feed intake that was significantly (P<0.05) different across the treatments. The average daily weight (g) ranged from 428.57 to 448.74. The highest and lowest average daily weight gain was observed in pigs fed from the combined feeders and the semi-automatic feeder respectively. The average daily feed intake (1579.03 g) of pigs fed from concrete feeding trough (T1) and that (1558.61 g) of those fed from semi-automatic feeder (T3) were similar. However, the feed intake (1666.56 g) of the pigs fed from combined feeders (T2) was significantly (P<0.05) higher. The total cost of feeding (₦) and average cost of feed per day (₦) were significantly (P<0.05) different among the treatments. The pigs that fed from the combined feeders (T2) had highest total cost of feeding (165.95) while the total cost of feeding for the pigs that fed from concrete feeding trough (T1) and semi-automatic feeder were comparable. No significant (P>0.05) difference exists in feed cost/Kg live weight gain (₦/Kg) across the treatments. The values ranged from 380.89 to 407.34 with the pigs fed from concrete feeding trough and the combined feeders having the highest and the lowest value respectively. The results showed a better performance in terms of final body weight and daily weight gain for pigs allocated to both semi-automatic feeder and concrete feeding trough during the weaner and grower phases. This is in agreement with the earlier results of He *et al*. (2016), the authors suggested that more feeder spaces to pigs could lead to a better feeding motivation with a consequent increase in growth. The improved growth performance observed in pigs fed with combined feeders (T2) reinforced the claims by several authors that feeders affect performance of pigs. This probably explained by a higher feed intake and minimal feed wastage. This also corroborates the earlier findings of Bergstrom *et al*. (2009) who reported improved growth performance in pigs fed with wet-dry feeders compared with pigs fed with conventional dry feeders. However, Bergstrom *et al*. (2009) reported no difference in feed intake, which is in line with the findings of this study. Lack of significant difference in many of the parameters also supports the earlier findings of Brumm and Gonyou (2001) who reported no significant difference in growth performance but improved performance in pigs fed with wet-dry feeders when compared with conventional dry feeders.

Conclusions

It could be concluded from the studies that the combination of concrete feeding trough and semi-automatic feeders improved the average daily weight gain and average daily feed intake of weaner and grower pigs compared with the individual use of the feeders. However, the total cost of feeding of the pigs fed from the combination of the feeders increased for the grower pigs compared to the use of either the concrete feeding trough or the semi-automatic feeder.

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Table 1. Ingredient Composition of the Experimental Diets

Ingredients (%)	**Weaner phase**	**Grower phase**
Maize	45	28.7
Ground nut cake	24	25
Palm Kernel cake	7.34	20
Rice bran	-	10
Wheat offal	10	-
High quality cassava peel	5	10
Fish meal	3	-
Bone meal	1.6	1.4
Limestone	0.8	0.7
Palm oil	2	3
Lysine	0.48	0.45
Methionine	0.03	-
Premix	0.25	0.25
Salt	0.5	0.5
Total	**100**	**100**
Calculated values		
Crude protein	20.83	19.72
Metabolizable energy (Kcal/kg)	2939.21	2921.84
Crude fibre	4.27	6.28

Table 2: Growth Performance and Economic Analysis of Pigs Fed from Different Feeders

Parameters	T1	T2	T3	Pvalue	SEM
Weaner's phase					
Initial weight (kg)	8.73	8.64	9.75	0.17	0.31
Final weight (kg)	27.32	29.35	28.06	0.72	1.03
Daily weight gain (g)	331.94	369.71	326.87	0.54	15.15
Average daily feed intake (g)	952.41	1021.14	988.51	0.61	27.86
Feed conversion ratio	3.06	2.99	3.30	0.60	0.13
Grower' phase					
Initial weight (kg)	18.40	18.03	18.08	0.86	0.31
Final weight (kg)	42.93	43.16	42.08	0.86	0.81
Average daily weight gain (g)	438.08	448.74	428.57	0.82	12.19
Average daily feed intake (g)	1579.03[b]	1666.56[a]	1558.61[b]	0.01	14.04
Feed conversion ratio	3.83	4.09	4.03	0.67	0.13
Economic analysis					
Weaner's phase					
Total cost of feeding (₦)	7170.4	7687.80	7442.2	0.61	209.79
Average cost of feed per day (₦)	128.04	137.28	132.90	0.61	3.75
Feed Cost/kg Weight Gain (₦/Kg)	411.05	401.99	444.14	0.60	17.71
Grower' phase					
Total cost of feeding (₦)	8805.40[b]	9293.40[a]	8691.50[b]	0.01	78.31
Average cost of feed per day (₦)	157.24[b]	165.95[a]	155.21[b]	0.01	1.40
Feed Cost/kg live weight gain (₦/Kg)	380.89	407.34	401.71	0.68	13.17

[ab] Means within the same row with different superscripts are significantly different ($p<0.05$), SEM: standard error of mean

Fig. 1: Concrete Feeding trough

Fig. 2: Combination of feeding troughs

Fig. 3. Semi-Automatic Feeder