MON -39

Effect of Strategic Feeding of Dried Oil Palm Slurry on Performance and Carcass Quality of Grower Pigs

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Abstract
In this experiment effect of dried oil palm slurry (DOPS) was assessed on feeding strategies of grower pigs. 45 cross bred grower pigs were randomly allotted into: Basal diet (Cassava peels and PKC) + concentrate (60:40) (T1), Basal diet +concentrate + DOPS (skip feeding) (T2), and Basal diet + concentrate + DOPS (Daily feeding) (T3) in a completely randomized design for 8 weeks. The weight of each animal and feed intake was measured weekly. At the end of the experiment, meat samples were collected for carcass analysis. Data obtained were analyzed using ANOVA and means were separated.Pigsfed T1 and T3 with an average daily feed intake(ADFI) of 0.446kg/day each hadsignificant ($p<0.05$) average daily weight gain (ADWG) of 0.189kg/day and 0.202kg/day, respectively. However, pig fed T1 showed significantly ($p<0.05$) high value (2.56) in the feed conversion ratio indication less utilization of feed. The live weights, bled weights, Eviscerated weight, dress weight showed significant ($p<0.05$) difference across the treatments with T3 having the highest value. There were significant ($p<0.05$) differences across the treatments in VLFOM and LR3/4FOM for TI, T2 and T3 with 0.35, 0.20, 0.40, and 0.30, 0.25, 0.60, respectively, however, LRFOM showed no significant ($p>0.05$) difference across the treatments.Based on findings from this study it can be concluded that feeding dried oil palm slurry daily will improve the performance and meat quality of growerpigs.

Keywords: Dried oil palm slurry, grower pigs, feeding strategies, skip feeding, daily feeding

Introduction

Provision of adequate and consistent dietary energy supplements for pigs productions is a major problem for smallholders in Nigeria. In order to ensure the sustainable swine production in many tropical countries,alternative feeding systems need to be studied, developed and extended (Perez, 1997). Such feeding systems should not compete with human requirements and should be cheap and environmental friendly. Therefore animal scientists for some time now have been looking at the prospects of using agricultural waste materials as veritable sources of feedstuff for livestock production. This is important because the main problem facing the development of a viable animal production industry seems to be the lack of an adequate local animal feed industry. The principal energy sources in Nigeria are either maize or guinea corn. Palm oil or groundnut oil is sometimes used to boost energy content of pig feeds (Perez, 1997). Much work has been done to find alternative protein sources to the conventional protein supplements but there is however, paucity of documented information on its use as alternative energy sources particularly for growing pigs.

Palm oil sludge has always been thrown off as a mere waste of the palm oil mill. It is treated as a nuisance and the approach has been to destroy it or reduce its pollution value to acceptable minimum levels. However, its proximate analysis indicates that it has excellent nutrient profile that is highly comparable to those of maize (Ezekwe *et al.,* 2011). Of all the palm oil produced in Africa, Nigeria is responsible for the highest in the continent with 970 metric tonne in 2016 (USDA, 2016). Palm oil products and invariably the sludge are very abundant in Nigeria and could easily be utilized as a very cheap and efficient source of unconventional feedstuff for the pig industry. However, this great potential which could revolutionize our pig production industry has hardly been utilized. There seems to be dearth of information regarding its usage and possible effects on pig production in Nigeria. There is therefore a high and urgent need to carry out a comprehensive study in this regard. This would throw more light on the potentials of the palm oil sludge in the feeding systems of pigs in Nigeria and the effect of these feed resources on the performance, quality of meat these-animals produce and organoleptic properties of this meat when further processed.

In this study therefore, the effect of strategic feeding of dried oil palm slurry on performance and carcass quality of grower pigs was evaluated.

Materials and Methods

This experiment was carried out at the Piggery unit, Teaching and Research Farm, University of Ibadan, Ibadan, Oyo State, Nigeria.Forty - Five crossbreeds (Large White X Landrace) grower pig were used for this

study, these animals were allotted randomly into three (3) dietary treatments with five replicates and three (3) pigs per replicate in a completely randomized Design (CRD). The duration of the experiment was eight weeks.

Two diets were formulated for this experiment, treatment 1 (T1) consisted of concentrates and basal diets (PKC, dried cassava peels and BDG) (40:60), with the same diet compositions of concentrates and basal diets (PKC, dried cassava peels and BDG), while treatment (T2)diet consisted of concentrates and basal diets and dried oil palm slurry (DOPS) (40:30:30) with 24-hours skip feeding and treatment 3 (T3) was given treatment (T2) diet but daily feeding.

Table 1: Gross compositions of concentrate ration formulated for growing pigs

Ingredient	Percentage
Maize	46.75
Wheat offal	30.00
Groundnut cake	10.00
Full fat soya	10.00
Bone mean	1.50
Oyster shell	1.00
Premix	0.25
Salt	0.5
Total	100
Calculated Analysis	
Crude Protein (%)	18.28
Energy (kcal/kg ME)	2720.5
Calcium (%)	0.99
Phosphorus (%)	0.68
Lysine (%)	0.74
Methionine (%)	0.27
Fibre (%)	4.53

Data collected includes weekly daily feed intake, weekly weight from which daily weight gain and feed conversion ratio was calculated. At the end of eighth weeks of feeding trial, three pigs were randomly selected from each treatment; live weights of the pigs were measured before slaughtering and evisceration. Slaughtered weight, eviscerated weight, bled weight, dressed weight,organs weight and back-fat thickness were measured.

Data obtained were subjected to one – way analysis of variance procedure of statistical analysis system Software (SAS, 1999). Treatments mean were separated using Fisher's Least Significant Difference option ($\alpha_{0.05}$) of the same software.

Results and Discussion

The feed intake of pigs in T3 differed significantly from pigs fed T1and T2 (Table 2). This showed that the energy made available to the pigs significantly improved by the daily inclusion of Dried Oil Palm Slurry (DOPS) and this was in support of Fanimo and Fashina-Bombata (1997) whoobserved a respective increase in feed intake, weight gain and back fat thickness in pigs fed POS(Palm oil Slurry). Bobadoye *et al*. (2006) also reported improved growth performance of broilers at up to 40% energy for energy substitution of POSfor maize.

Table 2: Performance of grower pigs fed slurry, concentrates and basal diets

Parameter	T1	T2	T3	SEM
Average initial weight(kg)	18.03	20.92	23.41	1.26
Average final weight (kg)	28.67^{ab}	25.82^{b}	34.75^{a}	1.63
Average daily weight gain(kg)	0.19^{a}	0.09^{b}	0.20^{a}	0.16
Average daily feed intake(kg)	0.45^{a}	0.22^{b}	0.45^{a}	0.01
Feed conversion ratio	2.36^{b}	2.56^{a}	2.21^{b}	0.50

^{a,b} Means with different superscripts in the same row differ significantly ($p < 0.05$)

SEM – Standard Error of Mean,T1 – Basal Diet + Concentrates; T2 – Basal Diet + Concentrates + Slurry (Skip), T3 – Basal Diet + Concentrates + Slurry (Daily)

Thus, POS, which is relatively uneconomical to humans, could be an alternative source of energy in livestock diets. The lower feed conversion ratio (FCR) (i.e better feed utilisation) observed in pigs fed T3 could be as a result of availability of metabolizable energy (as supplied by daily inclusion of DOPS) needed by the animal for its normal regular activities and growth. The poor FCR and lower ADWG in pigs fed T2 was due to the effect of 24 hours skip feeding which in turn leads to limited availability of energy and high fibre content of the diets (Sikka and Chawla 1984) which had a negative relationship with the Metabolizable Energy(ME) content of the diets.

Table 3:Carcass of pigs fed dried slurry

Parameters	T1	T2	T3	SEM
Live weight(kg)	21.00^{b}	16.00^{c}	25.00^{a}	1.33
Bled weight(kg)	18.00^{b}	16.00^{c}	24.00^{a}	1.24
Evisceration(kg)	12.00^{b}	13.00^{b}	18.00^{a}	0.97
Dress weight(kg)	11.00^{b}	12.00^{b}	15.00^{a}	0.67

^{a,b,c}Means with different superscripts in the same row is significantly different at p< 0.05.
SEM – Standard Error of Mean, T1 – Basal Diets + Concentrates; T2 – Basal Diets + Concentrates + Slurry (Skip), T3 – Basal Diets + Concentrates + Slurry (Daily)

Pigs fed treatment T3 (basal diet + concentrate + DOPS) had higher live weight and consequently higher carcass yield (Table 3). This is demonstrated by their high average daily weight gain (ADWG) and average daily feed intake (ADFI), implying that most of the nutrients digested were absorbed and assimilated into body tissues as compared to pigs fed T1 and T2 (Skip feeding). The heart, bile and kidney (Table 4) were higher for the pigs fed T3 diet than those fed T1 diet. This contradict the work of Adeshehinwa *et al.* (2011) that the relative organ weights of the pigs were not affected by cassava peel replacement with maize.

Table 4: Organ weights of pigs fed dried slurry

Parameters	T1	T2	T3	SEM
Heart(kg)	0.05	0.05	0.06	0.00
Liver(kg)	0.35	0.40	0.55	0.04
Lungs(kg)	0.13	0.15	0.15	0.02
Kidney (kg)	0.048^{b}	0.049^{b}	0.060^{a}	0.01
Bile (kg)	0.006^{b}	0.003^{b}	0.026^{a}	0.03

^{a,b,c}Means with different superscripts in the same row is significantly different at p< 0.05.
SEM – Standard Error of Mean T1 – Basal Diets + Concentrates; T2 – Basal Diets + Concentrates + Slurry (Skip); T3 – Basal Diets + Concentrates + Slurry (Daily)

Based on results from the present study (Table 5), pigs in T3 had the highest value for the three back-fat thickness measurements (VLFOM, LRFOM,LR3/4FOM) compared to pigs fed T1and T2. The result obtained in this study was supported by the findings of Fanimo and Fashina-Bombata (1997) that there is respective increase in back fat thickness when palm oil slurry (POS) diet was fed to weanerpigs.Pigs in T3 were fed with DOPS continuously for the eight weeks of the experiment thus increasing the fat deposition relative to pigs T2 that were fed intermittently,

Table 5: Carcass meat quality

Parameter	T1	T2	T3	SEM
VLFOM(inches)	0.35^{ab}	0.20^{b}	0.40^{a}	0.04
LRFOM(inches)	0.25	0.25	0.30	0.02
LR3/4FOM(inches)	0.30^{b}	0.25^{b}	0.60^{a}	0.06

^{a,b}Means with different superscripts in the same row is significantly different at p< 0.05.
SEM – Standard Error of Mean, T1 – Basal Diets + Concentrates; T2 – Basal Diets + Concentrates + Slurry (Skip), T3 – Basal Diets + Concentrates + Slurry (Daily); VLFOM –Back thickness measured 8cm away from the mid-line between 3rd and 4th lumber vertebrae; LRFOM – Back thickness measured 6cm away from the mid-line at the level of the last rib; LR3/4FOM – Back thickness measured 6cm away from the mid-line at the space between 3rd and 4th ribs starting from the last rib

Conclusion and Recommendation

From the result obtained in this experiment, it can be concluded that feeding dried oil palm slurry daily will improve the performance and meat quality of grower pigs. Although pigs fed dried oil palm slurry daily had the highest back fat thickness, considering the level of thickness of the fat and that the pigs are grower pigs, it is assumed this will not have any deleterious effect on the health of the animals.The findings of this study further demonstrate considerable scope for increased and more efficient utilization of agro-industrial by-products in pig feeds.

It is therefore recommended that further studies on more effective methods of combining oil palm slurry for improved pig performance should be consider and also efficient utilization of other agro-industrial by-products should be carried out.

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