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Growth Performance of Weaner Pigs Fed Graded Levels of Sundried Cassava Peel Meal

E.T.E. Ehebha, E.E. Adomeh and S.A. Eguaoje
Department of Animal Science, Faculty of Agriculture, Ambrose Alli University, P.M.B 14, Ekpoma Edo State
Corresponding author: S. A. Eguaoje; E-mail:eguaojeabiodunstanley@gmail.com; Phone: 07031677645

Abstract
A twelve-week feeding trail was conducted to evaluate the effects of cassava peel meal on growth performance of (24) crossbred weaner pigs allocated to four dietary treatments replicated three times in a Completely Randomized Design with each replicates having two pigs. Treatment I had 0% CPM while II, III and IV had cassava peel meal of 25%, 50% and 75% respectively. The pigs were allowed free access to feed and clean drinking water *ad-libitum* and routine management and medication were intact. Result on the growth performance revealed that the live weight was significantly ($p<0.05$) influenced with highest recorded in pigs fed the control comparable to those on 50% CPM. Daily and weekly weight gain of the pigs were significantly ($p<0.05$) influenced with highest values recorded in control comparable to those on 50%CPM, while lowest value was from those on diet 4. Daily and weekly feed intake were also significantly ($p<0.05$) highest among those fed 75% CPM, followed by those on 50% CPM, and least in control. Feed conversion ratio was also significantly ($p<0.05$) higher in those fed 75% CPM and least in the control though better in the control. Results obtained from the experiment showed that sun-dried cassava peel meal can effectively replace maize up to 50% level in diets of weaner pigs without any deleterious effects on the growth performance.

Keywords: Pig, cassava peel, feed, maize

Introduction

The need to adequately provide animal protein for the growing human population of third world/developing countries of the world is of major concern (FAO, 2007). It has been recognized over the years that the development of some sub-sector of the animal industry is one of the fastest means in bridging the deficiency gap between animal protein requirement and their actually supplied and consumed in most tropical countries (FAO,1997). This is due to their short generation interval, high fecundity and efficiency to readily convert kitchen and other waste products to meat.Commercialized production of these animals involves the use of ingredients that have prohibitive costs due to their comparative use between man, industries and animals/livestock swine have relatively simple digestive system, similar to humans (Akinmutimi, 2006). They are unable to utilize vast quantities of hay, silage or pasture grasses. Therefore, hog rations are made up primarily of farm grown grains, plus a protein supplement that includes vitamins and minerals.Maize has traditionally been the ingredient of choice for the supply of energy in monogastric animal diets with inclusion levels varying from 50 to 70% (PAN 1995). It important role as a human, animal and industrial food or feed ingredient coupled with drought in some parts of Africa have sometimes caused relative scarcity of maize and attendant increase in it price invariably heading to an increase in feed costs (Etuk *et al*., 2013).

There is therefore, a need to explore other potential energy sources which are either not consumed by humans directly or not in relatively high demand. Yam peels, cassava and its by-products which are cheap and readily available readily come to mind in this quest for energy provision in livestock diets. Limitations to the use of cassava in animal feed amongst others are it relatively low protein content (Salcedo *et al.,* 2010) and the dustiness of the feed (Mafouo *et al.,* 2011). Furthermore, its protein is of poor quality particularly with respect to the essential amino acid, compared to that of cereal grain (Olugbemi *et al;* 2010) when utilized in replacing cereal, in the diet for monogastric animals, it becomes imperative to balance for protein deficiency which is sometimes expensive (Okosun and Eguaoje, 2017).

This experiment was therefore embarked upon to examine the replacement value of cassava peel meal for maize on the performance characteristics of weaner pigs.

Materials and Methods

The experiment was conducted at the Piggery Unit, Livestock Teaching and Research, Farm, Faculty of Agriculture Ambrose Alli University Ekpoma for a period of twelve (12) weeks. Fresh cassava (*Manihot esculenta*) peels will be collected from local cassava processing centers or in-house cassava processors in Ekpoma Esan West local government area of Edo state. The cassava peels will be soaked in water inside a metal drum for three (3) days, after which they will be removed and drained with a basket and sun-dried for five (5) days to reduce the moisture content and improve the protein content it will equally reduce the hydrogen cyanide HCN content of the peel which is hazardous to the health of animals before milling to fine particles of 2mm in diameter, using a hammer mill. The resultant product will be taken to the animal science laboratory for proximate analysis (Table 1) after which it will be incorporated into broiler's diets at varying levels stipulated in the study.

Design and management of experimental pigs: 24 crossbred weaner pigs were used for the experiment. Two pigs each were selected based on their average initial weights and each group of pig was allotted to each of the four treatment diets (1, 2, 3 and 4) in a completely randomized design (CRD). Each treatment group contained 3 replicates of six pigs each.Known quantities of feed were offered to the animals twice daily with clean drinking water provided throughout. Animals were housed in well suitable pens adapted for pig production with wallows attached. IVOMERC was given as a dewormer for the pigs before commencement for the feeding trial. Daily and weekly records of feed intake and weight gain were taken while feed conversion ratio and protein efficiency ratio were estimated as well as mortality rate was recorded.

Experimental diets: A total of four treatment diets (1, 2, 3 and 4)pigs rations were formulated. Diet 1 was formulated to contain 0% cassava peel meal as the (control diet), while diets 2, 3 and 4 were formulated by replacing the 100% of maize in diet 1 with 25, 50 and 75% levels of cassava peel meal (CPM) respectively (Table 2). The rations formulated were of equal nitrogen (18%) and caloric values of (3000kcal/ME/Kg).

Performance study: During the feeding trial, the pigs were weight at the beginning of the experiment after the adjustment period and subsequently on a weekly basis. Weight changes and feed consumption was recorded daily and weekly, while weight gain, feed intake, feed conversion ratio (FCR), protein efficiency ratio (PER) was estimated to assess the growth performance of the pigs. Weight gain was calculated as final weight minus initial weight, feed conversion ratio (FCR) as feed intake divided by weight gain.

Statistical analysis: All the data collected were subjected to analysis of variance (ANOVA) and differences between means and treatments were determined using Duncan's multiple range test (DMRT) at 5 percent level of probability. All statistical procedures were according to (Steel and Torrie, 1990) with the aid of SAS (1999) package.

Table 1: Proximate Composition ofcassava peel as compared to maize

Constituents	Cassava peel meal	Maize
Dry matter	29.60	88.90
Crude protein	4.00	9.80
Crude fibre	16.6	2.70
Ether extract	1.30	2.40
Crude ash	68.50	74.90
NFE	5.90	1.90
ME (Kcal/Kg)	3005.50	3315.45

Source: Onyimonyi and Ugwu (2009); Lala, (2010)

Table 2: Percentage compositions of experimental diets.

Inclusion levels of cassava peels (%)				
	0	25	50	75
Ingredients	1	2	3	4
Maize	50.00	40.00	30.00	20.00
SDCPM	0.00	10.00	20.00	30.00
Palm kernel meal	19.00	23.00	25.00	29.00
Wheat offal	25.00	20.00	17.00	12.00
Fish meal	2.00	3.00	4.00	5.00
Lime stone	1.00	1.00	1.00	1.00
Bone meal	2.00	2.00	2.00	2.00
Premix	0.30	0.30	0.30	0.30
Methionine	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25
Salt	0.20	0.20	0.20	0.20
Total	100.00	100.00	100.00	100.00
Calculated analysis:				
Crude protein	18.33	18.41	18.74	18.63
ME (kcal/kg)	2957.62	2983.44	3005.50	2951.98

Results and Discussion

The performance characteristics of weaner pigs fed the treatment diets as reflected in (Table 3) revealed that final live weight, weekly and daily feed intake, weekly and daily weight gain and feed conversion ratio were significantly ($p<0.05$) influenced by the treatment diets. However, initial weight and protein efficiency ratio were not significantly ($p>0.05$) affected by the treatment diets. Higher final live weight of (48.52kg) was recorded among pigs fed the control diet, followed by comparable value of (48.11kg) among those placed on 50% cassava peel meal (CPM), followed by similar values of 44.12 and 45.09kg among weaner pigs fed 25 and 75% CPM respectively. The significantly high and comparable value recorded among those fed control and those fed cassava peel meal as high as 50% level of inclusion could be a pointer to the fact that pigs have the capability to digest feed containing high fibre. This finding is in consonance with the report of Olaifa *et al.* (2015) who reported a significant difference in the live weight of broiler chickens fed varying levels of cassava peel meal based diet.

Daily and weekly feed intakes were significantly ($p<0.05$) higher among pigs fed 75% CPM with mean value of (2.04 and 14.28kg), followed by (1.95 and 13.65kg) in pigs placed on 50% CPM, followed by (1.76 and 12.31kg) in those fed the control diet, while least mean value of (1.66 and 11.62kg) was recorded among pigs fed 25% CPM. The significant increase in the daily and weekly feed intake with highest value recorded among those fed 75%CPM could be due to the reduced level of the hydrogen cyanide in the basal diet and the ability of the pigs to digest feeds containing high fibre. This findings negates the findings of Olaifa *et al.,* (2015) who observed a decrease in the feed intake level as the inclusion of cassava peel meal increases in broiler diets. However, the findings of Olomu and Oboh (2007) are in agreement with the results of this experiment.

Daily and weekly weight gains were significantly ($p<0.05$) higher (0.65 and 4.55kg) among pigs fed the control, followed by comparable mean values of (0.59 and 4.29kg) in those placed on 50% CPM, followed by those on 25%CPM with mean values of (0.52 and 3.64kg), while lowest values of (0.43 and 3.01kg) were recorded in those placed on 75% CPM. The comparable higher value in weight gain recorded among those fed the control and those on 50% cassava peel meal is adduced to the fact that pigs fed diet 3 covert this by-product to tissue building as those on diet 1 does. Olomu and Oboh (2007) reported that an average daily weight gain of weaner pigs from 7-26kg body weight is in agreement with the results of this experiment. This is also in consonance with the findings of Wafar *et al.,* (2017) who also reported a significant variation in the weight gain of broiler chickens fed graded levels of sun-dried potato peel meal.Feed conversion ratio was significantly ($p<0.05$) higher in those fed 75% CPM with an average value of 4.87, followed by those on 50% CPM with a mean value of 4.51, followed by 3.43 in those fed 25% CPM and lowest 2.84 in those fed the control diet. These findings is in tandem with the report of Irelchore *et al.* (2011), who reported a significant differences in the protein efficiency ratio of pigs fed cassava peel meal based diets.

Table 3: Performance characteristics of weaner pigs fed the treatment diets

Inclusion levels of cassava peel meal (%)	0	25	50	75	
Parameters	1	2	3	4	SEM
Ave. Initial weight (Kg/pig)	20.00	19.82	21.03	21.67	0.12
Ave. Final live weight (Kg/pig)	48.52^{a}	44.12^{b}	48.11^{a}	45.09^{b}	0.04
Ave.Daily feed intake (Kg/pig)	1.76^{bc}	1.66^{c}	1.95^{b}	2.04^{a}	0.02
Ave.Weekly feed intake (Kg/pig)	12.31^{bc}	11.62^{c}	13.65^{b}	14.28^{a}	0.17
Ave. Daily weight gain (Kg/pig)	0.65^{a}	0.52^{b}	0.59^{ab}	0.43^{c}	0.02
Ave. Daily weight gain (Kg/pig)	4.55^{a}	3.64^{b}	4.29^{ab}	3.01^{c}	0.01
Feed conversion ratio	2.84^{d}	3.43^{c}	4.51^{b}	4.87^{a}	0.22

abc: Means in the same row with varying super script differ significantly ($p<0.05$); SEM±: standard error of means

Conclusion

It is therefore concluded that sun-dried cassava peel meal can effectively replace maize up to 50% level in diets of weaner pigs without any deleterious effects on the growth performance.

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