

**MON -80**

**Effect of Replacing Maize with Boiled Taro Cocoyam (*Colocasia esculenta*(L) Schott) on the Performance of Grower Pigs**

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**Abstract**

Fourteen(14) grower pigs, crosses of Large white and Duroc were obtained from the University of Calabar teaching and research farm. The pigs were randomly allotted to three experimental diets. The diets consisted of taro cocoyam (*Colocasia esculenta*) at the rate of 0%, 50% and 100% as a replacement for maize. The objectives were to determine the effect of replacing maize with boiled taro cocoyam on the growth performance of grower pigs and also to determine the effect of boiling on the antinutritional factors in cocoyam otherwise known as toxicants. Among the antinutritional factors determined were phytate, oxalate, tannin and saponins. Other parameters measured were feed intake, body weight gain, feed efficiency and feed cost. The results obtained showed that there were no much differences ( $p>0.05$ ) among the treatments in body weight gain, feed intake, feed efficiency and feed cost. The values were more or less the same. However, there were slight differences among the treatments but the difference among the treatments were not significant ( $p>0.05$ ) except in feed intake and feed cost. Moreover, it was discovered that boiling reduced the level of antinutritional factors in cocoyam when compared with that of unboiled cocoyam. It is therefore, concluded that boiled taro cocoyam can replace maize completely without adverse effect on the growth performance of pigs.

**Keywords:** Maize, boiled taro cocoyam, grower pigs, performance

**Introduction**

The rapid population growth and low animal protein intake are some of the major problems facing developing countries. An average Nigerian was obtaining about 7.5g of protein, a level far below the 28g and 35g of animal protein per day per person as recommended by the British Medical Association and Food and Agricultural Organization of the United Nations (FAO), respectively (FAO, 1976). Animal protein is essential because it is of a high biological value and contains the building stones for health and growth. It is needed by the young, the old and the weak. Pigs reproduce faster than other animals such as cattle and they have a very high prolificacy. Pigs convert farm-raised feeds into meat more cheaply and more rapidly than any other domestic animal. The pig carcass yields a higher percentage of dressed meat and a higher proportion of edible parts (Eusebio, 1980). Pork is very nutritious and tasty, as slaughtered animals are comparably young. Of all the factors which go into the cost of swine production, feed accounts for 75 to 80%. When feed prices are low, percentages of the total cost of production is reduced. Because of the high demand for maize by man for various uses and its competitive market, it can be replaced with cocoyam in pig ration as a substitute which is not usually used for needs. This will therefore tend to reduce the cost of swine production especially in the tropics. According to Cobley and Steele(1976), cocoyam is known to compose of moisture, carbohydrates (mostly starch), protein, fat, crude fiber, ash, vitamins, thiamine, riboflavin and niacin.

## Materials and Methods

This research was conducted at the piggery unit of the University of Calabar teaching and research farm. Fourteen (14) crossbred grower pigs of Large white and Duroc were used for this experiment. The experimental pigs were obtained from the University of Calabar teaching and research farm. The pigs were randomly allotted to three different pens; pen I, II and III. Pens I and II each contained five pigs while four pigs were kept in pen III. The experimental pigs were placed on three different treatments (diets); treatment I (0%), treatment II (50%) and treatment III (100%) according to their pens respectively. The treatment I (0%) which was control had no cocoyam, treatment II (50%) contained equal percentages (quantities) of maize and cocoyam while treatment III (100%) had no maize (table 1).

The major treatment materials used were maize and cocoyam. Others were soybean meal, bone meal, common salt, palm oil, wheat offal and palm kernel cake. The feed ingredients were manually mixed with the aid of shovel. The experimental pigs were fed between the hours of 7:30am-8:00am daily. The pigs on treatment I and II (0% and 50% diets) were fed at a quantity of 4.5kg each per day while pigs on treatment III (100% diet) were fed at a quantity of 4.0kg per day. These quantities were increased by 0.5kg every two weeks. The feeding trial experiment lasted for six (6) weeks and adequate water provided for the animals during the period. Before the feeding began, the initial body weights of the animals were recorded. The body weight gain of each of the pigs was obtained and recorded. This was done by subtracting the weekly body weights of each of the pigs from their initial body weights. The experimental design used for this experiment was Completely Randomized Design (CRD). Also, the cocoyam was processed in readiness for antinutritional factor analysis by boiling for about 45 minutes and allowed to cool. After cooling, it was chopped (sliced) into chips of about 3mm and sundried for 72 hours (3 days). It was thereafter taken to the milling machine and milled to a powder.

Table 1. Experimental diets

Ingredients used	TRT I (0%)	TRT II (50%)	TRT III (100%)
Taro cocoyam	0.0	15.0	30.0
Maize	30.0	15.0	0.0
Soybean meal	20.5	25.0	30.0
PKC	30.0	25.0	20.0
Wheat offal	15.0	14.5	13.5
Bone meal	2.5	2.5	2.5
Salt	0.5	0.5	0.5
Palm oil	1.5	2.5	3.5
Total	100	100	100
Calculated values			
Crude protein(%)	18.080	18.095	18.225
ME(Kcal/kg)	2572.50	2573.25	2582.50

## Results and Discussion

The result of feed intake, body weight gain, feed efficiency and cost of feed consumed are shown in table 2 (performance of grower pigs on boiled taro cocoyam diet as a replacement for maize). The results showed that there were not much differences among the treatments in feed efficiency and cost of feed consumed. The values are more or less the same. The similarity in all the parameters tends to indicate that pigs can utilize taro cocoyam as efficient as maize. The cost of feed decreases with increases in substitution of maize and was found to be significant ( $p < 0.05$ ) among the treatments. This was due to the reduced cost of cocoyam compared to maize. The result of the levels of antinutritional factors (toxicants) in boiled and unboiled taro cocoyam is shown in table 3. It is observed that boiling has an effect on the levels of antinutritional factors. Increase in boiling leads to a decrease in the level of antinutritional factors as determined and this decrease enhances adequate digestibility and metabolism of the feed when eaten by the pigs.

Table 2. Performance of grower pigs on boiled taro cocoyam diet as a replacement for maize

Parameter	0%	50%	100%
Average feed intake per pig per day (kg)	1.0	1.0	1.1
Average weight gain per pig per day (kg)	0.8	0.9	0.7
Average feed efficiency per pig per day	1.9	1.4	2.2
Average cost of feed consumed per pig per day	23.53	25.13	30.51

Table 3. Antinutritional factors in boiled and unboiled taro cocoyam as determined (mg/100g)

Parameter	Phytate	Oxalate	Tannin	Saponin
Boiled cocoyam	0.12 ± 0.02	1.76 ± 0.02	0.10 ± 0.01	1.20 ± 0.2
Unboiled cocoyam	0.19 ± 0.01	3.52 ± 0.05	0.14 ± 0.02	2.30 ± 0.1

### Conclusion

The results obtained showed that pigs fed boiled taro cocoyam as a substitute for maize had no significant difference on growth performance among the treatments. Also, boiling has an effect on the antinutritional factors in cocoyam. It is therefore, concluded that boiled taro cocoyam can replace maize completely without adverse effect on the growth performance of grower pigs.

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