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# Cost Effectiveness of Feeding Fermented Taro Cocoyam Meal to Laying Japanese Quails (Coturnix Coturnix Japonica)

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***Abstract:*** *The decreased predictability of seasons due to climate change has had negative effect on planting time and output of maize, a major energy source in the tropics. This negative effect is further reflected in the decreased availability and high cost of maize. However, the idea of making the most of what is easily available at the least cost, has informed research into root crops as important feed source in bridging the energy gap in poultry feeding. Two hundred and twenty five Japanese quails (Coturnix coturnix japonica) were randomly allotted to five dietary treatments (I-V) of 36 hens and 9 cockerels each. Each treatment was replicated thrice with 12 hens and 3 cockerels per replicate. In each of the five diets, 48hours fermented taro cocoyam meal (Colocasia esculenta var. esculenta) was used to replace maize at 0%, 25%, 50%, 75% and 100% for treatments I,II,III,IV and V respectively. The quails were fed one of the five experimental diets over a period of 70days (10weeks). Feed intake was significantly ($p<0.05$) influenced by diet with lowest values obtain for quails in treatment V. cost of feed was significantly ($p<0.05$) reduced by taro cocoyam. The cost of the feed per gram egg laid was least with treatment II. More saving accrued at 25%inclusion levels with highest profit and return to naira invested. Losses were observed at 75% and 100% level of inclusions. The results indicate that it is cost effective to replace maize with 25% of 48hours fermented taro cocoyam meal in the diet of laying Japanese quails.*

***Keywords:*** *Japanese quails, fermented taro cocoyam, cost effectiveness.*

## I. Introduction

Farm animals make important contribution to the global food security. They account for about 30% of the global value of food production and produce 34% of the protein and 16% of the energy consumed in human diet (FAO,2002). However, animal production in most developing countries faces a myriad of problems. The most important problem is that of competition of feed stuff with man and industries. This has contributed significantly to the high costs of ingredient in our local market thus creating problems for the industry in the area of providing good quality feed at affordable prices. Specifically provision of energy and protein in the diet of poultry accounts for about 90% of the cost of the whole diet and probably over 60% of the overall cost of production (Ojewola and Longe 2008)

The frequent collapse of many commercial poultry farms as well as occasional down turn in the growth of poultry industry in Nigeria have been attributed to high cost of poultry feed. In view of these, the use of local feed ingredient that are cheap and readily available should be a welcome development (Agede, et al, 2002). This work was therefore designed to evaluate the cost effectiveness of using 48-hours fermented taro cocoyam meal (FTCM) in the diets of laying Japanese quails.

## II. Materials And Methods

The birds(quails) used for the experiment were a total of twelve (12)hens and three (3) cockerels per replicate. However, each treatment was replicated thrice thereby giving a total of 36hens and 9cockerels in each treatment. On the whole, a total of 225 Quails(180hens and 45cockerels) were studied over a period of ten weeks. The birds were kept in Cross River University of Technology, Calabar. Birds were randomly allotted to five dietary treatments I,II,III,IV and V formulated with 48hours fermented taro cocoyam meal at 0%,25%,50%,75% and 100% levels respectively (Table I). Quails were housed in three tier cages made up of wood and wire mesh. Quails were fed at 8a.m with same quality of feed daily for various treatments. Fresh clean water was supplied ad libitum and daily records of the feed intake were kept. Eggs were collected daily and appropriate records kept. The quails were weighed once weekly after the initial body weights were taken. Cost of quail, feed,medication, transportation, repairs, and other expenses (miscellaneous) incurred during the 10weeks of research were recorded. Revenue generated from sales of quail, egg and manure were also recorded. The cost per gram, egg laid, cost of savings/g egg laid, total profit and returns to naira invested were also calculated. Chemical analysis of experimental diet was according to procedures of A.O.A.C(2000). Data obtained were subjected to analysis of variance using the randomized complete block design as described by

Steel and Torrie (1980). Least significant difference method was used to separate means that differed significantly (Steel and Torrie, 1980).

**Table 1: Composition of diet with 48hours fermented taro cocoyam meal (Colocasia esculenta var. esculenta) for laying japenese quails (Coturnix coturnix japonica).**

| Ingredients | 0% | 25% | 50% | 75% | 100% |
|---|---|---|---|---|---|
| Maize | 46.00 | 34.5 | 23.00 | 11.50 | 0.00 |
| Cocoyam | 0.00 | 11.50 | 23.00 | 34.50 | 46.00 |
| Soyabean | 20.80 | 21.00 | 19.70 | 19.90 | 20.50 |
| Fishmeal | 4.20 | 4.60 | 5.80 | 6.00 | 6.00 |
| Palm kernel cake | 10.90 | 10.00 | 10.00 | 10.00 | 10.00 |
| Wheat offals | 10.00 | 10.00 | 9.75 | 9.10 | 8.30 |
| Bone meal | 7.00 | 7.00 | 7.00 | 7.00 | 7.00 |
| Salt | 0.50 | 0.5 | 0.5 | 0.5 | 0.5 |
| Palm oil | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| Vit/min. premix | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| Total | 100 | 100 | 100 | 100 | 100 |
| Calculated crude protein% | 20.35 | 20.39 | 20.40 | 20.35 | 20.35 |
| M.E(Kcal/Kg) | 26144.44 | 2611.79 | 2612.60 | 2612.68 | 2611.34 |
| Analysed nutrient:Crude protein (%) | 21.20 | 20.84 | 20.78 | 20.63 | 20.59 |
| M.E (Kcal/Kg) | 2690.30 | 2679.58 | 2593.20 | 2562.20 | 2552.90 |

## III. Result And Discussion

It was observed that treatment 1 had the highest cost of feed (₦78.90k/g), followed by treatment II (₦75.50k/g), III(₦73.07k/g), IV(₦69.71k) and V(₦66.14k/g)(Table 2). The study showed that cost of production reduces with increasing levels of cocoyam in the diet. This was similar to the report of Agwunobi et al(2002) and Okon, et al(2008) who asserted that, cost of production reduces with increased level of cocoyam in the diets of pigs and quails respectively. The mean cost of feed intake per quail per week was significantly ($P<0.05$)lowest with quails in treatment V(9.89k). Cost of feed/eggs laid was least with treatment II. Cost of saving/eggs laid was observed to be least with treatment II(₦35.13k/g). Negative values were observed with treatments III,IV, and V signifying losses. Return to naira invested decreased with increased supplementation with cocoyam across the treatments Losses were accrued with treatment IV(-0.63k) and V(-0.83k). This implies that for every one naira invested on quails fed treatment IV and V, 0.63k and 0.83k will be lost respectively.

**Table 2: Economic analysis of 48hours fermented taro cocoyam diets fed to laying Japanese quails (Coturnix coturnix japonica)**

| Parameter | 0% | 25% | 50% | 75% | 100% |
|---|---|---|---|---|---|
| Cost of feed (₦/g) | 0.782 | 0.755 | 0.731 | 0.697 | 0.661 |
| Average cost of feed consumed (quail/g) | 10.03 | 10.18 | 10.20 | 10.40 | 9.89 |
| Cost of feed/eggs laid (₦/g) | 120.44 | 85.32 | 533.41 | 805.85 | 791.70 |
| Feed cost saving/eggs laid(₦/g) | | 35.12 | -412.97 | -685.41 | -671.26 |

**Table 3: Return to Naira invested for laying Japanese quails fed 48hours fermented taro cocoyam meal (Colocasia esculenta var esculenta)**

| Expenditure | 0% | 25% | 50% | 75% | 100% |
|---|---|---|---|---|---|
| Cost of unsexed quails (3 weeks) | 30.00 | 30.00 | 30.00 | 20.00 | 30.00 |
| Cost of feed/Kg/quail consumed from 7-16 weeks | 100.30 | 101.84 | 101.98 | 104.02 | 98.85 |
| Cost of transportation (Jos to Calabar) per bird | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Cost of medication/bird | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Cost of repairs | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Miscellaneous | 2.85 | 2.85 | 2.85 | 2.85 | 2.85 |
| Total Cost (TC) | 160.15 | 161.69 | 161.85 | 163.87 | 158.78 |
| Revenue | | | | | |
| Sales of eggs ₦80/dozen | 250.00 | 260.00 | 180.00 | 45.00 | 12.00 |
| Sales of manure per quail | 14.22 | 14.22 | 14.22 | 14.22 | 14.22 |
| Total Revenue (TR) | 264.22 | 274.22 | 195.22 | 60.22 | 27.22 |
| Profit (TR-TC) | 104.07 | 112.53 | 33.37 | -103.65 | -131.48 |
| Return to Naira invested(Profit/Total) | 0.65K | 0.70K | 0.21K | -0.63K | -0.83K |

## IV. Conclusion

The result indicates that it is cost effective to replace maize with 25% of 48-hours FTCM in the diets of laying Japanese quails.

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