

**EVALUATION OF PARTIAL REPLACEMENT OF MAIZE WITH
COOKED WILD VARIEGATED COCOYAM CORM MEAL
(*Caladium hortulanum*) IN BROILER STARTER DIET**

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Target Audience: Nutritionists, farmers and feed millers

ABSTRACT

A three-week feeding trial was conducted to evaluate the effect of partial replacement of maize with cooked wild variegated cocoyam corm meal (*Caladium hortulanum*) in broiler starter diet. Corms of wild variegated cocoyam were cooked for one hour (unpeeled), sliced to 1 cm thick flakes and sun dried for 4 - 5 days. The dried flakes were ground.

Four different broiler starter rations were formulated by substituting maize with the ground wild cocoyam corm meal at 0%, 33.3%, 50% and 66.6% levels respectively. Three hundred (300) two-week old broiler chicks of Ross breed were divided into four groups and each group randomly assigned to the four experimental diets, giving 75 birds per treatment group in a completely randomized design (CRD). Each treatment group was further subdivided into five replicates of 15 birds. Individual weights of the birds were recorded at the beginning of the experiment and thereafter on weekly basis. Feed and water were provided *ad-libitum*.

There was no significant ($P > 0.05$) differences among the treatment groups in feed intake and feed conversion ratio. The body weight gain of the birds decreased with increased replacement level of maize with cooked wild cocoyam corm meal. This decrease became significant ($P < 0.05$) at 66.6% dietary level.

The result of this trial suggests that cooked wild variegated cocoyam corm meal can replace 50% of dietary maize in broiler starter diet.

Key words: Maize, wild variegated cocoyam corm meal, broiler birds.

DESCRIPTION OF PROBLEM

Food production especially in developing countries has been a major concern to humanity. The problem is how to produce adequate food for the ever growing population. In Nigeria two out of every three babies are born to a life of poverty, misery and hunger (1). Concerted efforts should be made to ensure that essential foodstuffs reach the common man. This problem of inadequate food production is further compounded by the competition between man and livestock over food

grains.

Maize, sorghum, and cassava currently play major roles as energy feed ingredients in the feeding of non-ruminant animals in Nigeria. However, with increasing unavailability of these materials, coupled with the high cost of imported ingredients, the prices of commercial feeds have increased by about 2000% within the last decade (2). This has resulted in a crisis situation in the livestock industry in the country. There is therefore urgent need to turn attention to exploitation of novel or neglected crops particularly those that are indigenous to our tropical environment.

The wild variegated cocoyam (*Caladium hortulanum*) is a high forage and corm yielding tropical crop, currently used in Nigeria as an ornamental plant. It is weeded off from the farm because of its high rate of regeneration or regrowth. It has high potential as energy supplement in livestock feeds. The NFE content ranges from 75 - 85% and it attracts no competition between humans and livestock. However, it contains some anti-nutritive factors such as calcium oxalate which could be eliminated by boiling (2).

The objective of this trial is to evaluate the effect of partial replacement of maize with cooked wild cocoyam corm meal in broiler starter diet.

MATERIALS AND METHODS

The wild variegated cocoyam (*Caladium hortulanum*) corm used for this study was harvested from Achara Umuaka in Imo State. The corms were cooked for one hour (unpeeled), sliced to facilitate drying for 5 days. The dried flakes were ground and proximate analysis of the sample of the material conducted using standard methods (3) (Table 1). Mineral analysis was according to method (4).

Table 1. Chemical composition of cooked wild variegated cocoyam corm meal and maize.

Nutrients	Variegated cocoyam corm	Maize
Crude protein	7.15	9.20
Crude fibre	1.49	2.35
Ether extract	4.22	3.95
Calcium	0.74	0.28
Phosphorus	0.51	0.17
Metabolizable energy (Kcal/kg)	5.22*	3430.0

All values expressed on 100% dry matter basis

*Gross Energy (Kcal/g)

Four experimental diets were formulated such that cooked wild cocoyam corm meal replaced maize at 0%, 33.3%, 50% and 66.6% respectively. Levels of other feed ingredients remained the same in the four experimental diets (Table 2).

Three hundred (300) two-week old broiler chicks of Ross breed were divided into four groups and each group randomly assigned to the four experimental diets, giving 75 birds per treatment group in a completely randomized design (CRD). Each treatment group was further subdivided into five replicates of 15

birds and each replicate kept in a compartment measuring 6m x 8m. Individual

Table 2. Composition of experimental diets

Ingredients	Replacement levels of maize (%)			
	0	33.3	50.0	66.6
Maize	60.0	40.0	30.0	20.0
Variegated cocoyam	0.0	20.0	30.0	40.0
Groundnut meal	20.0	20.0	20.0	20.0
Fish meal	4.0	4.0	4.0	4.0
Palm kernel cake	2.50	2.50	2.50	2.50
Brewers' dried grain	4.0	4.0	4.0	4.0
Wheat offal	3.0	3.0	3.0	3.0
Blood meal	3.0	3.0	3.0	3.0
Bone meal	3.0	3.0	3.0	3.0
Vit/Min. premix*	0.25	0.25	0.25	0.25
Common salt	0.25	0.25	0.25	0.25
	100.0	100.0	100.0	100.0

Chemical composition

Crude protein	22.2	22.41	22.35	21.54
Crude fibre	4.00	4.32	4.30	4.41
Ether extract	4.44	4.22	4.26	4.27
Calcium	1.30	1.30	1.31	1.31
Phosphorus	0.71	0.70	0.71	0.69
ME (Kcal/g)**	3022.3	3015.1	3013.0	3012.5

* To provide the following per kg diet, vit. A 10,000 iu; vit D₃ 1500iu; vit E 3iu; vit K, 2mg riboflavin, 3mg; panthothenic acid, 6mg; niacin, 15mg; choline, 5mg; vit B12, 0.08mg; folic acid, 4mg; Mn, 8mg; Zn, 0.5mg; Iodine, 1.0mg; Co, 1.2mg; Cu, 10mg; Fe, 20mg.

**Calculated values

weights of the birds were recorded at the beginning of the experiment and thereafter on weekly basis. Feed and water were provided liberally. Feed intake was recorded daily and other routine poultry management practices were maintained. The trial lasted for 21 days.

Data collected were subjected to analysis of variances as outlined by (5). When analysis of variance indicated significant effect, means were compared as outlined by (6).

RESULTS AND DISCUSSION

The proximate composition of the wild cocoyam corm meal is presented in Table 1, nutrient and chemical composition of the experimental diets is shown in table 2. Data of the performance of the young broiler chicks fed the experimental diets are shown in table 3.

There were no significant ($P > 0.05$) differences in feed intake among the groups. Birds on 33.3% partial replacement of maize recorded the highest feed intake of 88.2gm while the group on the control diet (0%) recorded the lowest feed intake of 85.5gm. Body weight gain of the birds decreased with increased replacement

EFFECTS OF COTTON SEED CAKE SUPPLEMENTATION ON THE DRY SEASON PERFORMANCE OF WHITE BORNO GOATS

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Target Audience: Livestock farmers, animal nutritionists

ABSTRACT

The study was conducted to investigate the influence of three levels of cotton seed cake supplementation on voluntary intake, digestibility, and weight response of White Borno goats. The treatments imposed were, A: 50% *Panicum maximum* +50% groundnut haulm (control), B: control +250g cotton seed cake (CSC) and C: control+500g CSC/ head/day. Data were analysed as a complete randomised design. There was a substitution effect between the basal and supplement intake across treatments. Hay dry matter intake by animals on the control group was significantly higher than those supplemented. However, the values obtained from animals on treatments B and C were comparable. Total voluntary intake tended to increase with increased levels of supplementation and was significantly different among treatments ($P<0.05$). Crude protein intake, thoracic girth and weight gains were significantly improved in the supplemented groups, while treatment effects on the values obtained for height at withers were not significant. Live-weight gain was optimum at 250g CSC supplementation level. Both dry matter and crude fibre digestibility were significantly better for supplemented groups. The evaluation of animal weight gain across the treatments showed that there was no advantage in feeding supplement like cotton seed cake above 250g/head/day when a mixture of legume and grass hay formed the basal ration.

Key words: Supplementation, cotton seed cake, digestibility

DESCRIPTION OF PROBLEM

Inadequate nutrition remains the most important factor that limits high productivity of ruminants. The limitation to improved productivity is particularly more acute during the long dry season in semi-arid zone. In this zone, the climatic conditions are extreme; nutrition is poor and disease frequent. The dry season lasts for about 7-8 months (October - May), during which the available feeds (standing hays and crop residues) decline rapidly in quality (1) leading to low digestibility with intake becoming insufficient to maintain liveweight. The consequences of these are considerable weight loss and in some cases death of animals offered poor quality roughage without supplementation (2, 3). The problem of insufficient feed in the semi-arid zone of Nigeria especially during the dry season therefore demands an urgent attention since the region harbours the largest ruminant livestock population in the country (4). Therefore, the traditional system of goat production has to give way to semi and intensive system