

**EVALUATION OF RAW WILD AERIAL YAM BULBILS
(*DIOSCOREA BULBIFERA*) AS ENERGY SOURCE FOR
BROILER CHICKS.**

BY

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ABSTRACT

Twenty-one-day feeding trial was conducted to evaluate the nutritive value of peeled, sliced, sun dried and ground raw wild aerial yam bulbils (*Dioscorea bulbifera*) in broiler chick diets.

Four (4) diets were formulated such that raw wild aerial yam bulbil meal was included at 0%, 10% 15% and 20% respectively (replacing maize on weight for weight basis). The levels of other ingredients remained the same in the four treatment diets. Each diet was fed to a group of 54 broiler chicks in the starter phase. The average daily feed intake of the control (0%) group (49.76 gm/day) and the groups on 10% and 15% dietary levels (47.93 gm/day and 43.26 gm/day) were similar and significantly ($p < 0.05$) higher than that of 20% dietary level (35.07 gm/day). The average body weight gain and feed conversion ratio of the groups on 0% and 10% dietary levels were also similar and significantly ($p < 0.05$) superior to the groups on 15% and 20% levels. The results of the trial showed that broiler chicks (14 -35, days) could not tolerate sun dried, raw wild aerial yam bulbil meal beyond 10% dietary level.

Keywords: -Raw wild Aerial yam bulbils, Energy source, broiler chicks.

INTRODUCTION

Maize and other cereals currently play key role in the feeding of non-ruminant animals in Nigeria. However, with

increasing unavailability, coupled with high cost of maize and other cereals, the prices of commercial feeds have been on the increase within the last ten years. This has resulted in a crisis situation

in the livestock industry in the country. There is need, therefore, to turn attention to the exploitation of other novel carbohydrate-rich feedstuffs, particularly those that are indigenous to our tropical environment and are not competed for by humans.

The bulbils of wild aerial yam (*Dioscorea bulbifera*) stores starch like yam tubers which can serve as an alternative energy source in poultry feeding. Wild aerial yam has a wide range of adaptability, high production capacity, resistance to diseases and pest, tolerant to poor soils and grows wild (Purseglove, 1972). Chemical analyses of raw wild aerial yam bulbil at our station show that it contains 73.78% nitrogen free Extract (NFE) 4.89% crude protein and 2.15% Ash on dry matter basis. However, the bulbils contains some chemical components such as alkaloids or saponins in such quantities that may be toxic when eaten (Irvine, 1969). The toxic nature of the bulbils explains its

use a fish in Java (Kawasaki *et al*, 1968; Margaret and Brain, 1979). The toxic principle was identified to be dioscorine which is sometimes used as heart stimulant (Osagie, 1992). Further, another principle, a furanoid diterpense was isolated by Kawasaki *et al* (1968) and is probably responsible for the bitterness of the bulbils. The plant if properly harnessed offers an unlimited production potential. The trial herein reported was therefore designed to evaluate the nutritive value of raw wild aerial yam (*Dioscorea bulbifera*) for broiler chicks.

MATERIAL AND METHODS

Procurement and processing of material:-

The bulbils of wild aerial yam (*D. bulbifera*) were harvested from the wild, peeled, sliced to 10cm, sun dried for 3 days and ground into a meal. Samples were taken and their proximate composition determined (Table1) using standard methods (AOAC, 1980).

Table 1: Proximate Composition of raw wild aerial yam bulbils (*D. bulbifera* (% As fed Basis)

Moisture content	12.62
Dry matter	87.38
Crude protein	4.89
Crude fibre	6.0
Ether Extract	0.56
Ash	2.15
Nitrogen free Extract	73.78

Treatment Diets:-

Four (4) treatment diets were formulated such that raw wild aerial yam bulbils (*Dioscorea bulbifera*) meal was included at

0%, 10%, 15% and 20% respectively, replacing maize on weight for weight basis. The levels of other ingredients remained the same in the four treatment diets (Table 2).

Table 2: Percentage Composition of Experimental diets fed to Broiler chicks from 2-5 weeks of Age.

Ingredients	Inclusion levels (%)			
	0	10	15	20
Maize	60.0	50.0	45.0	40.0
Raw wild aerial yam	0.0	10.0	15.0	20.0
Groundnut meal	20.0	20.0	20.0	20.0
Brewers' Bried grains	6.0	6.0	6.0	6.0
Fish meal	4.0	4.0	4.0	4.0
Palm kernel cake	3.0	3.0	3.0	3.0
Blood meal	3.0	3.0	3.0	3.0
Bone meal	3.5	3.5	3.5	3.5
*Vit/Tm premix	0.25	0.25	0.25	0.25
Common salt	0.25	0.25	0.25	0.25
	<u>100.00</u>	<u>100.00</u>	<u>100.00</u>	<u>100.00</u>
Proximate Composition:				
Crude protein %	23.15	22.64	22.39	22.14
Crude fibre %	5.18	5.58	5.63	5.81
Ether Extract %	4.56	4.21	4.04	4.12
Calcium %	1.10	1.05	1.05	1.02
Phosohorus %	0.7	0.68	0.71	0.70
Matabolisable Energy (kcal/kg)	2.93	2.97	2.99	2.99

*To provide the following per kg of diet: Vit A, 8000 iu; D3, 2000 iu; vit E, 5iu; vit K, 2mg; riboflavin, 4.20mg vit B12, 0.01mg; Pantothenic acid, 5mg; nicotinic acid, 20mg; folic acid, 0.5mg; choline, 3mg; Mg, 56mg; I, 1mg; Fe, 20mg; Cu, 10mg; Zn, 50mg and Co, 1.25mg.

Treatment birds:-

Two hundred and sixteen (216), 14-day-old broiler chicks of Hubbard breed were selected from a batch of broiler chicks such that they weighed between 195 gm and 200gm each. The chicks were divided into 4 groups of 54 birds and each group was randomly assigned to each of the 4 treatment diets in a completely randomized design (CRD). Each group was further sub-divided into 3 replicates of eighteen (18) birds and each replicate kept in a compartment measuring 2m x 4m. feed and water were provided ad-libitum. The compartments were heated using kerosene and stoves and electric bulbs. Other routine poultry management procedures were maintained.

Data collection and Statistical Analysis:-

Feed intake was recorded daily and the birds weighed weekly. All data were subjected to analysis of

variance according to procedures described by Snedecor and Cochran, (1978). Duncan's New Multiple Range test (Obi, 1990) was employed to compare treatment means found to be statistically significant. The trial lasted for 21 days.

RESULTS

The proximate composition of the test material is shown in table 1, while the composition of the treatment diets is shown in table 2. The crude protein contents of the diets containing raw aerial yam bulbil meal were slightly lower than that of the control (0%) but they all met the crude protein requirement of broilers at that stage of growth. Data on the performance of the young broiler chicks fed on the various dietary levels of raw wild aerial yam bulbils is also presented in table 3.

Table 3: The effects of dietary inclusion of raw wild aerial yam bulbils (*D. bulbifera*) on the performance of broiler chicks (2 -5 weeks).

Parameters	0	Inclusion levels (%)			SEM
		10	15	20	
Initial body wt (g/bird)	185.0	195.0	190.0	185.0	0.20
Final body wt (g/bird)	605.0 ^a	535.0a	475.0b	380.0b	4.82
Body wt changes (g)	420.0 ^a	340.0a	285.0b	195.0b	5.12
Daily body wt gain (g)	20.0 ^a	16.19a	13.57b	9.29b	3.65
Daily feed intake (g)	49.76 ^a	47.93a	43.26a	35.07b	8.13
Feed conversion Ratio	2.49 ^a	2.96a	3.18b	3.77b	0.16

^{ab} Means within rows with different superscripts are significantly different ($p < 0.05$)

Feed intake of the birds decreased with increasing dietary levels of raw wild aerial yam bulbil meal.

This decrease became significant ($p < 0.05$) at 20% dietary level. Body weight gain of the birds followed the same pattern as in feed intake, decreasing with increasing levels of raw wild aerial yam bulbil meal. However, this decrease became significant ($p < 0.05$) at 15% dietary level. The group on 0% dietary level of raw wild aerial yam bulbil meal recorded the best feed conversion ratio while the group on 20% dietary level recorded the poorest feed conversion ratio of 3.77.

DISCUSSION

Raw wild aerial yam bulbils contains anti-nutritional factors such as alkaloid dioscorine which is sometimes used as heart stimulant (Osagie, 1992), Diosgenin and Saponins in Such quantities that may be poisonous when eaten. Diosgenin is an example of a steroidal saponin and contains the A, B, C and D steroidal ring system, when combined with sugars,

sapogenins for saponin compounds give a lather with water and it is toxic to both cold and warm blooded animals (Irvine, 1969; Morgaret and Brain, 1979; Kawasaki et al, 1968), and furanoid diterpene a bitter principle responsible for the bitterness of the bulbils. In addition raw wild aerial yam bulbils contains other constituents such as calcium Oxzlate which causes irritation of the gut or acidity, phytic acid, hydrocyanic acid and Tannins which combine with proteins to render it nutritionally unavailable (Eka, 1985).

These anti-nutritional factors are possibly the reasons for the poor performance of the birds fed raw wild aerial yam bulbils beyond 10% dietary level.

The results of this trial suggest that young broiler chicks could not tolerate raw wild aerial yam bulbil meal beyond 10% dietary level. However, more work is required to determine ways of improving the nutritive value of raw wild aerial yam bulbils for broiler birds. This form part of our focus in future investigation.

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