SHORT COMMUNICATION

GROWTH PERFORMANCE OF COCKEREL CHICKS FED CASSAVA LEAF MEAL

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ABSTRACT

The effects of diets containing 0, 150 and 300g/kg sun-dried cassava leaf meal (CLM) on the growth performance of cockerel chicks were studied. The experimental diets A, B and C were both isonitrogenous and isoenergetic in formulation. Chicks on diets A, B and C consumed 89.89, 103.16 and 104.71g/bird/day, respectively. The mean daily body weight gain showed significant difference (P <0.05) between treatments A and C but not between B and C (P>0.05). The highest mean daily body weight gain (20.11g/bird) was obtained on diet A, while the lowest value (11.70g/bird) was obtained on diet C. The chicks on diets B and C showed a continous depression in growth rate with increasing dietary CLM. The feed conversion ratio showed significant differences (P<0.05) between treatments. A value of 0.22 was obtained on diet A, while 0.11 was recorded on diet C. The chicks on treatment A tended to rest more often than those on treatment B or C, which appeared more "active" and "visited" the feed troughs more often.

Key Words: Cassava leaf meal, Growth performance, Cockerel chicks.

INTRODUCTION

The prohibitive cost of conventional feed ingredients has necessitated the use of agro-industrial by-products in animal feeds. Feed ingredients like wheat offal, dried brewers' grains, rice bran, corn bran, etc. hitherto considered as wastes, have been evaluated and found suitable for incorporation into poultry diets (Fetuga and Tewe, 1985). Similarly, processed cassava peels have been used as substitutes for the conventional dietary energy sources in cockerel diets. Osei and Daudu (1988), Aina (1990), Ogbonna (1991) showed that the energy and fibre requirements of cockerels can be adequately met through the use of cassava peels, without necessarily affecting production, growth rate and carcass quality of the birds.

Reports on the utilization of cassava leaves as dietary sources of energy in poultry and livestock nutrition are scanty. However, Bokanga (1994) reported that in the cassava growing areas of Africa, the leaves constitute a major component of the diet. The nutritive value of cassava leaves has been reviewed by Lancaster and Brooks (1983). West *et al.*, (1988) indicated that the proximate composition of cassava leaves compared favourably well with the composition of other feeds, such as soybean and maize grains. Research conducted in Zaire (Lutaladio and Ezumah, 1981) showed that harvesting cassava leaves once every two months does not have any negative effect on root yield. Bokanga (1994) reported that a farmer can harvest 7 - 20 tons of cassava leaves per hectare. Gomez *et al.*, (1985) has shown that cassava leaf protein is low in sulphur amino acid while West *et al.*, (1988) reported that cassava leaves have a well-balanced amino acid composition with essential amino acid profile better than the standard FAO/WHO (1973) reference pattern. Luyken *et al.*, cited by Lancaster and Brooks (1983) indicated that the protein digestibility is 80% in younger leaves and 67% in older leaves. However, cassava leaves contain very high levels of cyanogenic glucosides and large amounts of the enzymes, linamarase, which is capable of breaking down linamarin and lotaustralin (Bokanga, 1994). Boiling pounded leaves speeds up the removal of hydrocyanic acid (HCN) from the pounded cassava leaves through rapid evaporation.

TABLE 1: COMPOSITION OF EXPERIMENTAL DIETS (%)

FEEDSTUFFS	A	B	C
Cassava leaf meal (sun-dried)	-	15.0	30.0
Groundnut cake	10.40	10.50	8.40
Wheat offal	16.30	16.50	16.30
Palm Kernel cake	20.0	16.80	14.0
Soybean cake	14.0	14.20	12.0
Fish meal	3.0	3.30	4.0
Bone meal	3.0	0.50	2.0
Palm oil	4.0	0.40	1.0
Vit - min - Premix*	0.50	0.50	0.50
Oyster shell	1.0	1.0	1.0
Methionine	0.20	0.20	0.20
Lysine	0.10	0.10	0.10
Salt	0.50	0.50	0.50
Calculated Nutrient Content			
Crude Protein (%)	21.16	20.77	20.56
ME (Kcal/g)	2.63	2.61	2.61

*A vitamin trace mineral mix manufactured by Pfizer Feed Company, Lagos, for starter chickens to supply/kg feed the following: Vit. A (IU) 10,000; Vit. D. (I.U) 2,000; Vit. E (I.U) 2.5; Vit K (mg) 20; riboflavin (mg) 2.4; Pantothenic acid (mg) 5.0mg; Nicotinic acid (mg) 20; Chlorine (mg) 300.0; Folic acid (mg) 0.5; Methionine (mg) 0.225; Mn (mg) 56.0 I (mg) 1.0; Fe (mg) 20.0; Cu (mg) 10.0; Zn (mg) 50; Co (mg) 1.25.

In the light of the year-round availability and nutritive value of cassava leaves, this study was designed to evaluate the growth performance of cockerel chicks fed graded levels of sun-dried cassava leaf meal (CLM).

MATERIALS AND METHODS

The cassava leaves used in this study were collected from the cassava plantations in the Oluyole Local Government Area of Ibadan city. The leaves, harvested at 9 - 10 months of age, were of mixed varieties. They were sun-dried to a moisture level of 15 - 18% of clean cement floors for 4 days, after which they were gorund in a hammer mill, packed in polythene bags and stored at room temperature.

The experimental diets A, B and C, containing 0, 15 and 30% CLM, respectively, were formulated. The diets were both isonitrogenous (21% CP) and isoenergetic (2.6KCal/g ME) in formulation. All diets had equal levels of fish meal, premix, oyster shell, methionine, lysine and salt. These rations and their calculated chemical compositions are shown in Table 1.

Birds and Management

Fifty-four, 2-week-old Hyperco cockerel chicks were used for this study which lasted for 8 weeks and was carried out at the Bora Poultry Farm of the Institute of Agricultural Research and Training, Moor Plantation, Ibadan, Nigeria. They were fed the commercial starter chick mash for 7 days, after which they were weighed individually and randomly alloted to the treatments. They were placed on the experimental starter chick mash for 8 weeks. Each treatment consisted of 3 replicates with 6 chicks making up a replicate. Feed and water were provided *ad-libitum*. Weight gain and feed intake were recorded weekly while routine vaccinations and necessary medications were carried out on the chicks as and when necessary.

Chemical Analyses:

The test ingredient (CLM) and the experimental diets were analysed separately

TABLE 2: PROXIMATE, ENERGY AND CHEMICAL COMPOSITION OF CASSAVA LEAF MEAL USED ON THE EXPERIMENT (DM BASIS)

Analysis	Concentration
Dry Matter (%)	89.57
Ash (%)	10.57
Crude Fibre (%)	4.16
Ether Extract (%)	4.10
Crude Protein (%)	34.25
Nitrogen - Free - Extract (%)	35.22
Gross Energy (Kcal/g)	4.02
Free HCN (mg/kg)	36.7
Water soluble oxalate (%)	0.65
Total Acid soluble Oxalate (%)	3.43

TABLE 3: GROSS ENERGY AND CHEMICAL COMPOSITION OF EXPERIMENTAL DIETS (DM BASIS)

Analysis%	DIETS		
	A	B	C
Dry matter	90.78	90.52	90.82
Ash	8.40	9.00	10.43
Crude fibre	10.16	10.08	7.79
Crude Protein	21.35	20.95	21.45
Ether Extract	9.61	3.61	6.55
Gross Energy (KCal/g DM)	2.78	2.51	2.55

TABLE 4: PERFORMANCE CHARACTERISTICS OF CHICKS FED THE EXPERIMENTAL DIETS

Performance Criteria	Diets			
	A	B	C	SEM*
Mean Daily Feed Intake (g/bird)	89.89^{a}	103.16^{b}	104.16^{c}	3.20
Mean Daily Weight Gain (g/bird)	20.11^{c}	16.20^{b}	11.70^{a}	0.98
Feed Conversion Ratio	0.22^{c}	0.16^{b}	0.11^{a}	0.67

* Mean with different superscripts on the same row differ significantly ($P<0.05$).

for their proximate constituents (Table 2 and 3 respectively) according to AOAC (1980) procedure.

The energy contents were determined with a ballistic bomb calorimeter in which benzoic acid was used as a standard. The hydrocyanic acid (HCN) and oxalate contents of the test ingredient were determined, respectively acid (HCN) and oxalate contents of the test ingredient were determined, respectively, by the methods of Cooke (1979) and Dye (1956).

Statistical Analysis:

The data obtained in these studies were subjected to analysis of variance using Completely Randomised Design. The Duncan's Multiple Range Test (Steel and Torrie, 1980) was used to assess significant differences.

RESULTS

The results of the performance of the birds are shown in Table 4.

The mean values for daily feed intake showed significant differences ($P<0.05$) between treatments. Treatment A had the lowest mean daily feed intake (89.89g/bird), while treatment C had the highest (104.71g/bird). The mean daily body weight gain showed that differences ($P<0.05$) existed between B and C. Futhermore, there was a significant differences ($P<0.05$) between diets A and B. The highest mean daily body weight gain (20.11g/bird) was obtained on diet A, while the lowest value (11.70g/bird) was obtained on diet C. The chicks on diets B and C showed a continuous depression in growth rate with increasing dietary CLM. The feed conversion ratio showed significant differences ($P<0.05$) between the treatments. The chicks on treatment A were less "active" and "sat" or "rested" more often than those on treatment B or C, which were more "active" and "visited" the feed troughs more often.

DISCUSSION

Absence of dietary CLM alters the dietary texture or density of the diet as well as the size and hardness of the food particles and thus reduces the amount of dust. Feed consumption and utilization may be affected by each of the above factors independently or in combination (Nir *et al.,* 1994). Allred *et al.,* (1975) have shown that very hard granules are left un-eaten. Richardson *et al.,* (1960) made purified diets acceptable by producing granules that were not too hard.

Feed utilization was improved by increasing the density independent of the amount consumed (Nir *et al.,* 1994). Ziegenhagen *et al.,* (1947) reported that in turkey poults, during the starting period, a 50:50 mixture of crumbles and mash gave a performance equal to or better than that obtained with feeding crumbles alone. These observations give accord to the performance reported in the present study. Chicks on diet`C consumed more feed with attendant depression in weight gain as the dietary CLM increased. Meal length and frequencies differed significantly ($P<0.05$) between treatments. The birds on treatment C visited the feeding troughs more often and spent more time feeding than the birds in treatments A or B. Thus, the birds on treatment C expended more energy than those on treatments A or B and hence, gained less weight.

These observations were in accord with the conclusion of Savory (1974) and Nir *et al.,* (1994), who observed that chickens fed dense diets were less "active", they "sat" more and spent less time eating and thus expended less energy. It has also been observed (Savory, 1974) that birds fed on dense, hard feeds waste less feed and record lower mortality rate. In the present study, chicks fed on diet C spilled more feed than those on diets A or B, while the two mortalities recorded during the study occured in chicks on diet C.

It may be concluded that the differences in the efficiencies with which diets A and B were converted by the birds are mainly due to differences in the energy expended in feeding and drinking. The observations in the present study are in accord with those of other workers (Savory, 1974; Nir *et al.,* 1994), who carried out behavioural studies on chickens. The present study emphasises the sensibility of cockerel chickens on dietary CLM. The 30% CLM inclusion did not support growth rate.

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