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PERFORMANCE OF COCKEREL CHICKSFED DIETS CONTAINING GRADED LEVELS OF CASHEW (*Anarcadium occidentale* L.*)* PULP MEAL

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ABSTRACT

One hundred and fifty (150) day-old cockerel chicks were used in a five week feeding trial to evaluate five (5) diets, in which cashew pulp meal (CPM) replaced 0%, 10%, 20%, 30% and 40% of maize in T_0, T_1, T_2, T_3 and T_4, respectively. Each treatment had thirty (30) cockerel chicks, with 10 birds per replicate. All performance parameters measured were significantly different ($P<0.05$). Final weight (FW), daily weight gain(DWG), daily feed intake (DFI), feed conversion ratio (FCR), mortality, feed cost/kg gain (FC/kg gain) and cost of 1kg feed ranged from 300.00-352.68g, 7.21-9.03g, 23.01-26.58g, 2.74-3.50, 3.33-13.33%,₦361.32-₦439.60 and ₦115.43-₦135.46, respectively. It was concluded that inclusion of cashew pulp meal (CPM) in the diets of cockerel chicks depressed weight gain, live weight and resulted in poorer FCR. However, the progressive inclusion of cashew pulp meal in the diet resulted in concurrent reduction in the cost/kg of feed, and the most economic production when 30% maize was replaced by cashew pulp meal. Based on the results of this feed trial, replacement of maize by CPM in cockerel chicks' diet may prolong the attainment of market weight of birds, because of depressed performance.

Keywords: *Performance, cockerel, cashew pulp meal,*

INTRODUCTION

Poultry production remains one of the veritable ways of achieving sustainable and rapid production of high quality protein to meet the increasing demand of the Nigerian teeming populace (Apata and Ojo, 2000). In Nigeria, there is inadequate supply of grains, grains by-products, oil seed cakes and some agro-industrial wastes to sustain small to medium scale poultry production (Kperegbeyi and Onwumere, 2007). The growth and development of the industry is confronted by high cost of feed and drugs and their occasional shortages (Amerah *et al.,* 2007). According to Apata and Ojo (2000), the high cost of compounded feed for poultry is derived largely from the exorbitant prices of feed ingredients, increasing competitive demand for them by man and animals, as well as scarcity of conventional ingredients such as maize, sorghum, groundnut cake, soyabean and fish meal. Oladunjoye *et al.,* (2004) stated that high cost of maize makes it difficult for farmers to afford the feedstuff. Competition between man and his animals for cereals, pulses, and oil seeds is partly responsible for the ever increasing livestock feed cost. The fact that the availability of the world's raw materials is dwindling as population grows exponentially, together with the real threat of global food shortages, contributes to growing awareness of the need for conservation and the re-use of things which once would have been thrown away without a second thought (Abioye *et al.,* 2006). According to Oyewole *et al.* (2013), livestock feed cost is one of those variables that have contributed to the high cost of production. The solution to this problem lies in the evaluation of alternative feed ingredients. However, such alternatives should possess nutritive value and be cheaper than the conventional protein and energy sources (Oladunjoye *et al.,* 2004). There have been several attempts to reduce cost of production by replacing conventional feedstuffs, with agro-industrial by-products such as maize offal, cassava peel meal, and rice offal among others (Ademosun, 1976; Deolanker and Singh, 1979; Ogbonna *et al.,* 1993; Dafwang and Shwarmen, 1996). Fanimo *et al.,* (2007) reported that in many developing countries, there exist large untapped potential feedstuffs for poultry. Perhaps among these is the cashew pulp meal (CPM) which is obtained after cashew juice is squeezed from its berry, dried and milled.

Justification of the Study

There is a dearth of information on the use of cashew pulp as non-conventional feed stuff for cockerel production, besides, its availability of large quantity in the study location, where is often left to rot after removal of the nut, thereby constituting environmental problem.

Objective of the Study

To determine the performance of cockerel chicks fed graded levels of cashew pulp meal (CPM).

MATERIALS AND METHODS

Experimental Location

The study was conducted at the Poultry Unit of the Teaching and Research Farm of Kogi State University, Anyigba in Dekina Local Government Area. The experimental location falls within the southern Guinea savanna zone of Nigeria on longitude $07^0$29'N and latitude $07^0$11'E of the Greenwich meridian (Ifatimehin *et al.,* 2006).

Experimental Layout and Management of Birds

One hundred and fifty (150) day-old cockerel chicks, Abor acre strain were purchased and allocated in a Completely Randomized Design (CRD) to five (5) treatments of three (3)

replicates each. Five on-farm formulated diets were compounded, in which cashew pulp meal (CPM) replaced 0%, 10%, 20%, 30% and 40% of maize in T_0, T_1, T_2, T_3 and T_4, respectively. Each treatment had thirty (30) cockerel chicks such that each replicate had ten (10) birds which were raised on deep litter. The feeding trial commenced soon after the arrival of the birds. The feeding trial lasted for five weeks. Standard management practices were observed, i.e. vaccination and medication. Feed and drinking water were provided *ad libitum*. Fresh cashew pulps were collected into clean grain bags from different cashew plantation in Dekina Local Government Area of Kogi State, Nigeria. The pulps were rinsed with clean water after which the juice expressed with the aid of hydraulic press machine. The compressed cashew pulps were spread on a clean concrete floor to dry until the pulp became crispy. The dried cashew pulps were milled such that the particles could pass through 2mm mesh sieve. The cashew pulp meal was used to substitute 0, 10, 20, 30, and 40% dietary maize in the experimental diets.

Performance Indices

Initial body weight of birds was determined by weighing the birds per replicate at the beginning of the experiment, weekly thereafter and at the end of fifth week. Total weight of birds per replicate divided by the number of birds gave rise to initial weight of a bird. Daily feed intake was determined by subtracting the left over from the quantity of feed offered. Weight gain was determined by subtracting initial weight from final weight, taking into account the number of birds. Daily weight gain per bird was obtained by dividing weight gain per bird by the number of days for the feed trial. Also feed conversion ratio was determined by dividing intake by weight gain. Mortality was estimated by the following formula

$$\text{Percentage mortality (\%) was determined By} = \frac{\text{No. of dead birds X 100}}{\text{Total number of birds}}$$

The economic indices estimated included; cost of producing a unit kilogram of the feed and cost of feed per kilogram weight gain by the birds

Statistical Analysis

All data collected were statistically analyzed using the Analysis of Variance (ANOVA) with the aid of Statistical Package for Social Sciences (SPSS). Where significant effects were obtained, means were separated using Duncan's Multiple Range Testas incorporated in SPSS.

Table 1: Gross and Nutrient Composition of Experimental Diets (% DM basis)

Ingredient	Level of inclusion of cashew pulp meal %				
	T_1 (0)	T_2 (10)	T_3 (20)	T_4 (30)	T_5 (40)
Maize	44.00	39.60	35.20	30.80	26.40
Cashew pulp meal	0.00	4.40	8.80	13.20	17.60
Maize offal	15.00	15.00	15.00	15.00	15.00
Soyabean meal (full fat)	37.00	37.00	37.00	37.00	37.00
Bone meal	3.30	3.30	3.30	3.30	3.30
Methionine	0.15	0.15	0.15	0.15	0.15
Common salt	0.30	0.30	0.30	0.30	0.30
Vitamin premix	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Nutrient composition /Energy					
Crude protein	20.41	20.55	20.68	20.82	20.96
Crude fibre	4.78	6.58	4.50	4.87	5.21
Ether extract	5.80	5.45	6.15	5.98	5.75
Ash	7.94	10.22	7.94	8.93	8.77
**Calcium	1.02	1.00	0.99	0.98	0.97
**Phosphorous	0.50	0.49	0.48	0.47	0.46
*Kcal/kgME	3037.77	3025.90	3130.95	3101.13	3121.10

**Calculated without contributions from cashew pulp meal

*Calculated ME= 37 x %CP + 81 x %EE + 35.5 x %NFE (Pauzenga, 1985)

RESULTS AND DISCUSSION

Results

The performance of cockerel chicks fed the experimental diets is shown in Table 2.The level of inclusion of the test material (cashew pulp meal) affected (P<0.05) all the performance and economic parameters measured in this study. Final weight (FW), daily weight gain(DWG), daily feed intake (DFI), feed conversion ratio (FCR), mortality, feed cost/kg gain (FC/kg gain) and cost of 1kg feed ranged from 300.00-352.68g, 7.21-9.03g, 23.01-26.58g, 2.74-3.50, 3.33-13.33%,₦361.32-₦439.60 and ₦115.43-₦135.46, respectively.

Table 2: Performance of Cockerel Chicks Fed Cashew Pulp Meal Based Diets

Parameter	T_1 (0)	T_2 (10)	T_3 (20)	T4 (30)	T_5 (40)	SEM
Initial weight (g)	46.63	47.03	47.17	47.00	47.17	0.10
Final weight (g)	362.68^{a}	318.60^{c}	342.78^{ab}	316.11^{c}	300.00^{c}	8.67
Daily weight gain (g)	9.03^{a}	7.75^{c}	8.44^{b}	7.67^{c}	7.21^{d}	0.15
Daily feed intake (g)	24.78^{d}	26.04^{b}	26.58^{a}	23.01^{e}	25.32^{c}	0.15
Feed conversion ratio	2.74^{a}	3.37^{d}	3.16^{c}	3.00^{b}	3.50^{e}	0.15
Mortality (%)	13.33^{a}	13.33^{a}	6.67^{b}	3.33^{c}	3.33^{c}	1.82
Cost of feed/kg (₦)	135.46^{a}	130.46^{b}	125.45^{c}	120.44^{d}	115.43^{e}	1.89
Cost of feed/kg gain (₦)	372.51^{ab}	439.60^{e}	396.43^{cd}	361.32^{a}	404.00^{d}	15.84

^{abcde}=Means with different superscripts on the same row differ significantly (P<0.05),
SEM = Standard error of mean

DISCUSSION

Observed result for final weight of birds indicated that inclusion of CPM depressed live weight. This is in consonance with the findings of Oyewole *et al.* (2017) when starter broilers were fed CPM based diets. The control (0%CPM) had the best daily weight gain while those on 40%CPM inclusion had worst. This agrees with the findings of Kardivel *et al.,* (1993) who reported a progressive decline in weight gain of broilers fed 15%CPM and above. This observation follows similar trend as final weight (FW) of the birds. Observed values for feed intake indicate that the substitution of maize by the CPM did not affect palatability and acceptability of the diets by the birds. Birds on CPM diets consumed more feed than those on the control. This is in consonance with the findings of Ramos *et al.* (2006) who reported that the inclusion of dehydrated cashew bagasse in the diet of broilers increased feed intake. Feed conversion ratio (FCR), an indication of the utilization of the diets was depressed in the CPM group, although with no clear pattern of variation. The FCR was best with birds on 0%, then 30% but worst with birds on 40% maize replacement by CPM. This observation could be compared to the report of Kardivel *et al.* (1993) and Ramos *et al.* (2006), who observed that the inclusion of cashew bagasse in diet of broilers increased feed intake but depressed feed efficiency. Mortality was recorded across all the treatments, which may suggest that CPM is safe for cockerels, since 0%CPM and 10%CPM had highest mortality while those on 30 and 40%CPM had least Cost/kg feed decreased across the treatments with increase in the rate of inclusion of cashew pulp meal (CPM), the control gave the highest cost of ₦135.46 and those on 40% CPM inclusion the least. This trend may be due the cheaper cost of CPM relative to maize. This agrees with the findings of Oyewole *et al.* (2017), who reported that the progressive inclusion of cashew pulp meal in broiler starter diets resulted in concurrent reduction in cost/kg of feed. Cost of feed/kg gain was best with birds on 30%CPM and worst with those on 10%CPM. Hence the most economic diet was 30%CPM while those birds fed with 10%CPM poorest.

CONCLUSION AND RECOMMENDATION

The inclusion of cashew pulp meal (CPM) in the diets of cockerel chicks depressed weight gain, live weight and resulted in poorer feed conversion ratio than the control. However, the progressive inclusion of cashew pulp meal in the diet resulted in concurrent reduction in the cost/kg of feed, and the most economic production when 30% maize was replaced by cashew pulp meal. Based on the results of this feed trial, replacement of maize by CPM in cockerel chicks' diet may prolong the attainment of market weight of birds, because of depressed performance.

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