Inclusion of Discarded Cashew Kernels (Dck) in the Diets of Cockerel Chicks

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Target Audience: Poultry farmers, animal nutritionists, research scientists.

Abstract

Groundnut cake was replace with discarded cashew kernels (DCK) at 0,33 $^1/_3$, 66 $^2/_3$ and 100% levels in the diets of cockerel chicks for 56 days in a completely reandomized design. 120 day old chicks were randomly distributed into 4 treatments. Each treatment was replicated 3 times with 10 chicks per replicate. There were no significant differences (P>0.05) in average feed intake, body weight, body weight gain, feed conversion ratio (feed: gain), efficiency of feed utilization (gain: feed) and mortality. In addition, feed cost kg^{1} and feed cost kg^{1} body weight gain decreased as DCK increased in diets. Hence, it is evident that DCK can conveniently be used to replace GNC up to 100% level in the diets of cockerel chicks. Further, the fact that no bird died during the experiment indicated absence of deleterious factors in and safety of DCK.

Keywords: Discarded Cashew Kernel (DCK), Groundnut Cake (GNC), cockerel chicks, Performance.

Description of Problem

Generally, protein sources are expensive. Yet animal protein sourcs like fish meal are more expensive that plant protein sources like groundnut cake (GNC), soya bean meal and cottonseed meal. Hence, more of plant protein sources are used in poultry feed formulation than animal protein sources. Attempts to feed plant protein sources like sunflower cake and GNC to broilers (7), Leucaena seed meal (6) and Neem seed kernel meal (8) to broilers indicate that search for alternative feedstuffs is a continuous exercise. Similarly, DCK, an agro-industrial by-product was fed to cockerels. Meanwhile, it has been reported in literature that dry matter of cashew fruit consisted of 51.8% apple, 15.5% kernel and 32.8% while glycolipid and phospholipid accounted for the remaining 4% (4). The objective of this study, therefore, is to determine the effect of replacing GNC with DCK at 0,33 $^1/_3$, 66 $^2/_3$ and 100% levels in the diets of cockerels.

Materials and Methods

Discarded Cashew Kernels (DCK) used in the experiment were purchased from Mellagro Exports, a cashew nut processing factory in Oyo, Oyo State while cockerels chicks were purchased from poultry investigation centre, Fashola, Oyo. DCK replaced GNC at 0,33 $^1/_3$, 66$^2/_3$ and 100% levels in the diets of cockerel chicks. 120 day old chicks were used in 4 treatment in a completely randomizd design for 56 days. Each treatment was replicated 3 times. Proximate composition of DCK was done by using the procedure of (2). Feed and water were made available to the chicks *ad libitum*. DCK crumbs were ground at the plate mill to make the kernels conform with the granulation of other feed ingredients and to ease intake of feed by birds.

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The chicks were given Mareck's Vaccine and New Castle Disease Vaccine (intraocular at day old), New Castle Disease Vaccine (NDV) lasota during the third week and Gumboro Vaccine during the second and fifth week respectively Occasionally, antibiotics (like embarzin forte, neoseryl plus and terramycin chick formula) and anti-stress (like biovit) were administered to the chicks.

Data were collected on body weight and body weight gain while feed conversion ration and feed utilization were calculated. Data collected were subjected to analysis of variance according to the procedure of Steel and Torrie (1980).

Table 1: Determined Chemical Composition (%) of discarded cashew kernel

Crude protein (Nx 6.25)	10.40
Crude fiber	8.21
Ether extract	38.30
Nitrogen free extract	33.17
Ash (Total)	2.94
Dry Matter	93.02
M.E. *(kcal kg^1) (calculated)	5058

*M.E. – Metabolizable energy

Table 2: Composition (%) of experimental diets for cockerel chicks

Ingredients	100% GNC 0%DCK (Control)	$66^2/_3$GNC $33\ ^1/_3$ DCK	$33\ ^1/_3$ GNC $66^2/_3$DCK	0%GNC 100%DCK
Maize	40.00	34.00	24.00	14.00
Groundnut cake	21.00	14.00	7.00	-
Discarded Cashew Kernel (DCK)	-	7.00	14.00	21.00
Fish meal	2.25	2.25	3.00	3.00
Blood meal	0.25	3.00	4.00	7.75
Palm kernel meal	4.00	5.00	4.00	3.00
Maize offal	5.75	2.75	2.00	2.00
Wheat offal	23.50	28.75	38.75	46.00
Bone meal	2.00	2.00	2.00	2.00
Oyster shell	0.50	0.50	0.50	0.50
Salt (Nacl)	0.50	0.50	0.50	0.50
Precix*	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00
Calculated chemical composition (%):				
Crude protein	20.65	20.03	20.00	20.52
Crude fiber	5.04	5.55	6.02	6.54
Ether extract	4.14	3.68	3.17	2.54
Calcium	1.14	1.13	1.17	1.16
Phosphorus	0.52	0.43	0.59	0.55
M.E. (Kcal kg-1)	2662.00	2671.00	2664.00	2604.00

* Vitamin A – 6,000.00i.u, Vitamin D_3 – 1,200,000i.u, Vitamin E – 6,000i.u, Vitamin K – 400mg, Vitamin B_2 – 200mg, Vitamin B_6 – 600mg, Biotin – 40 mg, Niacin – 12,00mg, Pantothenic acid – 400mg, Folic acid – 400mg, Choline cholorids – 160,000mg, Vitamin C – 400mg, Iron – 24,00mg, Manganese – 12,000mg, Copper – 400mg, Zinc – 28,000mg

Results and Discussion

Determined chemical composition of DCK is shown on Table 1, composition of diets on Table 2 and performance of cockerel chicks on Table 3. It is evident from Table 1 that DCK contains a lot of oil (38.30%) (a source of energy) and has a high metabolizable energy (5058 Kcal kg-1). There were no significant differences (P<0.05) in the average feed intake, body weight gain, feed conversion ratio (feed: gain) and feed utilization (gain: feed). There was a slight increase in the average body weight of cockerel chicks as quantity of DCK increased in the diets. A similar feed: gain pointed to similar feed utilization. Similarly, when neem seed kernel meal was used to replaced GNC in broiler diets, it did not influence body weight of male broiler chickens. (9).

When leucaena seed meal was used to replaced GNC at 0, 5, 10 and 20% levels, there was increase mean feed intake (4) but in this study, there was similarity in feed intake as DCK replaced GNC at 0, 33 1/3, 66²/3 and 100% levels in the diet of cockerels chicks. Feed intake only dcreased insignificantly (P<0.05) as DCK increased in the diets. This observation certifies appropriateness or adequacy of energy content of GNC-, GNC - DCK- and DCK - based diets for the nutritional/metabolic requirements of the chicks. In fact, (1) reported that birds fed ad libitum adjust their feed intake to meet energy requirements, hence, birds consume more of bulky feeds which have low energy contents.

Table 3: Performance of Cockerel Chicks

	Experimental			diets	
Parameters	100% GNC 0% DCK (Control)	$66^2/_3$ GNC $33\ ^1/_3$ DCK	$33\ ^1/_3$ GNC $66^2/_3$ DCK	0%GNC 100% DCK	S.E.
Feed intake (g/bird)	1607.83	1599.19	1567.57	1560.65	6.01
Body weight (g/bird)	448.72	484.61	453.84	479.48	4.95
Body weight gain (g/bird)	417.95	452.56	426.92	452.56	1.99
Feed conversion ration (Feed:gain)	3.85	3.53	3.67	3.45	0.10
Feed utilization (gain : feed)	0.26	0.8	0.27	0.29	0.12
Mortality (%)	0	0	0	0	0
<u>Cost of Production:</u>					
Feed cost kg¹ (N)	20.43	19.08	18.20	16.77	-
Feed cost kg¹ live weight gain (N)	78.59	67.83	66.83	57.82	0.003

Average body weight of cockerels fed diets containing any quantity of DCK was heavier that the average body weight of cockerels on GNC - based diets (control). It implies that a combination of two plant protein sources may be better than the presence of one plant protein source in the diets of birds. (8) too concluded that a combination of certain vegetable protein sources in the right proportions is better than a single source of protein in broiler diets. However, cockerels fed 100% DCK - based diets were the biggest.

Replacement of GNC with DCK resulted in improved or higher average body weight, average body weight gain, lower feed conversion ratio and better feed utilization. This observation indicates that the four diets satisfactorily supported growth, livebility and good performance of cockerel chicks. (7) also reported that when GNC was replaced with sunflower cake in the diet of broilers, improved growth rate and utilization efficiency of energy and protein were obtained.

In this study, replacement of GNC with DCK resulted in reduced feed cost kg^1 and reduced fed cost kg^1 body weight gain as DCK increased in the diets. The use of DCK may lead to increased gain for users of DCK. Even (5) reported that plant protein sources brought about significant differences in feed (kg) cost per dozen eggs.

Conclusions and Applications

1. DCK can conveniently replace GNC in the diets of cockerels without any adverse effect on the health of cockerel chicks.
2. The use of DCK may lead to reduction in the cost of production and by this increase profit margin of users.
3. DCK can replace GNC totally (at 100% level) in the diets of cockerels.
4. Inclusion of DCK in the diets of cockerel chicks led to better performance of the cockerel chicks.

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