EVALUATION OF PERFORMANCE AND CARCASS CHARACTERISTICS OF BROILERS FED GRADED LEVELS OF RAW COCOA BEAN SHELL BASED DIETS

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ABSTRACT

A total of one hundred and fifty day old Anak broiler chicks were randomly allotted to five dietary treatments with 30 birds per treatment, replicated thrice, in a completely randomized design, the treatments were: A (0% CBS-control diet); B (5% RCBS); C (10% RCBS); D (15% RCBS) and E (20% RCBS). All the birds were fed *ad libitum* throughout the experimental period of eight weeks. The feed intake and weight gain were monitored. The performance and carcass characteristics were studied. Significant differences were observed in the feed intake, weight gain and feed conversion ratio. Also significant difference were obtained in the value of plucked weight, eviscerated organ, dressed percentage, while the value obtained for thigh ,drumstick and gizzard were not significantly different with the birds fed graded level of raw cocoa bean shell based diets. RCBS could effectively replace maize up to 10% in the diets of broilers without any deleterious effects.

Keywords: Evaluation, cocoa bean shell, carcass characteristic, broilers, performance.

INTRODUCTION

Poultry production in the tropics is facing the challenges of poor nutrition. (Babayemi *et al,* 2000). Livestock and poultry generally compete with humans for maize grain. The competition that exists between man and his livestock has necessitated the search for alternative ingredients. Large quantities of cocoa bean shell are produced and wasted annually by farmers and associated processing industries in Nigeria. Cocoa bean shell (CBS) is a waste from cocoa processing industries in Nigeria and it constitutes a serious disposal problem (Hamzat, *et. al.*, 2006; Olumide *et al.*, 2008). There is paucity of information on the use of graded levels of raw cocoa bean shell in the diets of broiler birds. Therefore, the objective of this study is focused on evaluation of performance and carcass characteristics of broilers fed graded levels of cocoa bean shell based diets.

MATERIALS AND METHOD

A total of one hundred and fifty day old broilers were used for this research. This experiment was carried out at University of Ibadan, Teaching and Research Farm, livestock section for a period of eight weeks. The birds were randomly allotted to five dietary treatments with ten birds per replicate in a completely randomized design. The CBS used in this study were sourced from Cocoa Industry in Lagos. The treatments were; A (0 % CBS- control), B (5 % RCBS), C (10 % RCBS), D (15 % RCBS) and E (20 % RCBS). The birds were fed *ad libitum.* Weekly records of body weight and daily feed intake were taken. Feed conversion ratio was calculated as a ratio of feed consumption and body weight gain. At the end of 8 weeks, five birds were randomly selected from each of the replicates for carcass analysis. The selected birds were starved overnight and their live weights recorded. The birds were slaughtered by severing the jugular vein and were fully bled before scalding in hot water. The birds were de-feathered after scalding and their plucked weights were taken. The birds were eviscerated and the eviscerated weight recorded. The dressed weights, thigh weights, drumsticks and organ (Liver, heart and gizzard) weight were expressed as percentage of live weight. All data collected were subjected to analysis of variance (ANOVA) of SAS (1999) and significant means were separated using Duncan multiple range test of the same software.

RESULTS AND DISCUSSION

The gross composition of the starter and finisher diets is as shown in Tables 1 and 2. Result of performance of the birds is shown in Table 3.

There were significant (P<0.05) differences in feed intake between birds on the control and RCBS supplemented diets. The weight gain and feed conversion ratio of bird fed the RCBS based diets were significantly **(P<0.05) different from their contemporary on** the control diets (A). The mortality rate was highest with the bird fed with diet containing 20 % RCBS. This showed that the tolerable level of raw cocoa bean shellwas exceeded at 20%. Table 4 showed the carcass characteristics of broilers fed raw cocoa bean shell based diets. Significant difference (P<0.05) were obtained in the values of plucked weight, eviscerated weight, visceral organ, dressed % while the values obtained for thigh, drumstick, gizzard and heart were not significantly different.

CONCLUSION

It can therefore be concluded that broiler can effectively utilize RCBS up to 10% inclusion in the diet,
without compromising the performance and the health status of the birds.

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Table 1: Gross composition of Broiler starter diets

Ingredients (kg)	A (0%)	B (5%)	C (10%)	D (15%)	E (20%)
Maize	57.00	54.15	51.30	48.45	45.60
Cocoa Bean Shell (CBS)	-	2.85	5.70	8.55	11.40
Soybean meal	33.51	33.51	33.51	33.51	33.51
Fishmeal 72%	1.00	1.00	1.00	1.00	1.00
Full fat Soya	4.10	4.10	4.10	4.10	4.10
Oyster shell	0.50	0.50	0.50	0.50	0.50
Bone meal	3.30	3.30	3.30	3.30	3.30
Methionine	0.04	0.04	0.04	0.04	0.04
Salt	0.30	0.30	0.30	0.30	0.30
Premix	0.025	0.025	0.025	0.025	0.025
Total	100.00	100.00	100.00	100.00	100.00
CALCULATED NUTRIENTS					
Crude Protein (%)	23.21	23.41	23.62	23.83	24.04
Metabolisable Energy (Kcal/kg)	2951.62	2925.57	2899.52	2873.47	2847.40
Crude Fibre (%)	4.01	4.34	4.66	4.99	5.35

Table 2: Gross Composition of Experimental Broiler Finisher Diets.

Ingredients (kg)	A (0%)	B (5%)	C (10%)	D (15%)	E (20%)
Maize	57.00	54.15	51.30	48.45	45.60
Cocoa Bean Shell (CBS)	-	2.85	5.70	8.55	11.40
Soybean meal	25.80	25.80	25.80	25.80	25.80
Palm kernel oil	2.47	2.47	2.47	2.47	2.47
Full fat Soya	10.00	10.00	10.00	10.00	10.00
Oyster shell	0.50	0.50	0.50	0.50	0.50
Bone meal	3.30	3.30	3.30	3.30	3.30
Methionine	0.08	0.08	0.08	0.08	0.08
Salt	0.30	0.30	0.30	0.30	0.30
Premix	0.025	0.025	0.025	0.025	0.025
Total	100.00	100.00	100.00	100.00	100.00
CALCULATED NUTRIENTS					
Crude Protein (%)	21.48	21.69	21.90	22.11	22.32
Metabolisable Energy (Kcal/kg)	3122.33	3096.28	3070.23	3044.18	3080.13
Crude Fibre (%)	3.81	4.14	4.47	4.80	5.12

Table 3: Performance Characteristics of Broilers fed raw cocoa bean shell Based Diet

Parameters	A (0%)	B (5%)	C (10%)	D (15%)	E (20%)	SEM
AVERAGE FEED INTAKE {g}	4556.50^{a}	4529.00^{b}	4200.50^{c}	4177.50^{d}	4097.00^{e}	2.33
INITIAL WEIGHT {g}	37.00	37.00	37.00	36.00	36.00	-
FINAL WEIGHT {g}	1952.00^{a}	1812.00^{b}	1739.00^{c}	1630.00^{d}	1550.00^{e}	7.34
AVERAGE WEIGHT GAIN {g}	1915.00^{b}	2076.56^{a}	1901.00^{b}	1806.00^{c}	1665.00^{d}	1.84
FCR	2.37^{b}	2.55^{d}	2.58^{c}	2.40^{b}	2.81^{a}	0.21
MORTALITY %	0.00	3.33	3.33	6.66	10.00	0.01

Note: Values with different letters on the same row are significantly (P>0.05) different.

Table 4: CARCASS CHARACTERISTICS OF BROILERS FED GRADED LEVELS OF RCBS BASED DIETS.

PARAMETERS	0% Control	5% RCBS	10% RCBS	15% RCBS	20% RCBS	SEM
Live weight(g)	1952.00^{a}	1812.33^{b}	1739.67^{c}	1630.67^{d}	1550.67^{e}	9.38
Plucked weight(g)	1752.00^{a}	1708.67^{a}	1489.67^{b}	1380.00^{a}	1360.67^{c}	9.15
Eviscerated weight (g)	1518.67^{a}	1493.33^{a}	1348.67^{b}	1280.33^{b}	1130.00^{c}	8.09
Visceral organ	233.33^{a}	200.00^{b}	150.00^{d}	146.67^{e}	176.67^{c}	8.56
Dressed weight(g) %	1438.03^{a}	1286.88^{b}	1215.50^{b}	1116.67^{c}	1116.67^{c}	12.9
Dressed %	73.67^{a}	71.02^{a}	69.90^{a}	67.00^{b}	69.07^{a}	1.23
Breast %	23.00^{a}	23.00^{a}	22.00^{a}	21.00^{b}	19.80^{b}	2.34
Thigh %	15.76	15.55	15.69	15.36	14.15	2.12
Drumstick %	14.99	14.50	14.50	14.00	14.00	1.52
Organ weight						
Gizzard %	3.24	3.08	3.36	3.41	3.59	0.88
Liver %	2.76^{d}	3.33^{c}	3.88^{c}	4.34^{b}	5.31^{a}	0.40
Heart %	0.68	0.66	0.66	0.62	0.61	0.12

a, b, c, d, e = Means along the same rows with different superscripts are significant ($P < 0.05$)
RCBS = Raw Cocoa Bean shell; SEM=Standard Error of Means.