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Haematology and Performance Characteristics of Broiler Chickens Fed Dried Cashew Apple as Replacement for Maize

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Abstract
Conventional feed ingredients like maize have become more expensive due to competition between man, industry and livestock. Alternative ingredients such as dried cashew apple pulp have become a major focus of the broiler industry. This study was to evaluate the effect of replacing maize with dried cashew apple pulp (DCAP) in broilers chicken diets on haematology and performance characteristics. A total of 250 four weeks old Arbor Acre plus commercial broiler chickens were randomly selected and assigned to 5 dietary groups of 0%, 5%, 10%, 15% and 20% DCAP replacement for maize in a twenty- eight day trial in a complete randomized design. Each group comprised 5 replicates of 10 birds each. Blood from the birds was collected for haematological parameters using a standard procedure. Data collected were subjected to ANOVA $\alpha_{0.05}$There were no significant differences ($p>0.05$) in haemoglobin red blood cell count, white blood cell count, mean cell hemoglobin concentration (MCHC), mean cell volume (MCV) and mean cell haemoglobin (MCH). It was observed that 10% replacement level had the highest final weight, weight gain and least feed conversion ratio (FCR) while 20% replacement level had the least final weight, weight gain and highest FCR. Dried cashew apple therefore, can be used successfully at 10% replacement for maize without deleterious effect to performance characteristics and haematological indices.

Keywords: Haematology, growth, dried cashew apple pulp, maize, broiler chicken.

Introduction

The bid to lower the cost of broiler production through alternative ingredients has resulted in the transformation of materials referred to as farm wastes into commercial products thus reducing cost of feed, environmental pollution and increased farmers income from the crop. Cashew production estimated at 894,368 in 2014 (FAOSTAT 2015). Cashew apple is about 5-10 times the size of the nuts and less than 10% of it is utilized in Nigeria while the rest is left to rot on the farm (Oduwole *et al.,* 2001). There has been advocacy for the development of acceptable products from cashew apple for its further utilization (Ogunjobi and Ogunwolu, 2010).Dried cashew apple pulp or waste has been included in rabbit and goat feed in Nigeria without any deleterious effect by Fanimo *et al*. (2003) and Okpanachi *et al*. (*2016*) respectively.

The objective of this study was to evaluate the effect of feeding dried cashew apple pulp (DCAP) in replacement for maize on haematology and performance characteristics of broiler chickens at finisher phase.

Materials and Methods

The experiment was carried out at the Teaching and Research Farm of the University of Ibadan, Ibadan. Two hundred and fifty -four weeks old Arbor Acre Plus broiler chickens were randomly litter pens. The feed was presented in mash form and water was provided *ad libitum.* The dietary treatment contained 0%, 5%, 10%, 15% and 20% DCAP replacement for maize (Table1). Records of feed intake and weight gain were taken weekly. At the end of the experiment, birds were fasted overnight; two birds per replicate were bled for haematological analysis.

All data collected were subjected to analysis of variance (ANOVA) and means were separated by Duncan Multiple Range Test.

Results and Discussion

There was no significant difference in all the haematological parameters analysed in this study thereby implying that the inclusion of dried cashew apple pulp or the replacement of maize with afore-mentioned as no deleterious effect to broiler health; this is as shown in Table 2. However best overall weight gain and feed conversion rate was obtained at 10% replacement of maize with DCAP which were significantly different from 20% replacement as shown in Table 3. This is in agreement with Adebowale *et al*. (2008) who reported that high inclusion or total replacement of conventional with alternative feed ingredients usually results in high feed intake and reduction in weight gain.

Table 1: Gross composition of broiler chickens fed DCAP in replacement for maize at finisher phase

	DCAP				
Ingredients kg/100kg	0%	5%	10%	15%	20%
Maize	58.35	55.43	52.52	49.6	46.8
Soybean meal	15.5	15.5	15.5	15.5	15.5
Wheat offal	3	3	3	3	3
Dicalcium phosphate	1.25	1.25	1.25	1.25	1.25
Fishmeal	0	0	0	0	0
Salt	0.25	0.25	0.25	0.25	0.25
Broiler premix	0.25	0.25	0.25	0.25	0.25
Methionine	0.15	0.15	0.15	0.15	0.15
Lysine	0.1	0.1	0.1	0.1	0.1
Full fat soybean meal	19.1	19.1	19.1	19.1	19.1
Limestone	1.65	1.65	1.65	1.65	1.65
Palm oil	0.65	0.65	0.65	0.65	0.65
Dried cashew apple pulp	0	2.92	5.83	8.75	11.67
Total	100.25	100	100	100	100
Calculated analysis					
Crude protein	19.9705	20.03182	20.09293	20.15425	20.22637
Metabolizable energy	3071.85	3035.262	2998.8	2962.213	2929.705

Table 2: Haematologyof broiler chickens fed DCAP in replacement for maize at the finsher phase

	DCAP						
Parameters	0%	5%	10%	15%	20%	SEM	P value
Hb(g/l)	8.82	9.05	8.85	8.73	8.77	0.369	0.973
PCV(%)	29.17	27.83	26.83	26.83	0.27	1.06	0.507
MCV(*fl*)	92	91.96	99.61	90.47	97.19	7.813	0.939
MCH(g/dl)	28.22	29.82	32.5	29.44	31.6	1.7042	0.638
MCHC (g/dl)	30.58	32.49	32.9	32.55	32.2	0.724	0.328
PLT($X10^3$/ul)	212.667	180.166	276	263.333	170.167	48,343.38	0.907
WBC($X10^3$/ul)	15.966	14.3	15.066	16.758	15.658	2978.325	0.907
RBC($X10^4$ul	3.22	3.1	2.82	3	2.92	0.254	0.832

Hb – Haemoglobin, PCV – Packed cell volume, PLT – Platelet, WBC – White blood cell, RBC – Red blood cell, MCH – Mean Corpuscular Volume, MCH – Mean Corpscular Haemoglobin, MCHC -- Mean Corpuscular Haemoglobin Concentration

Table 3: Performance indices of broiler chicken DCAP in replacement for maize

Parameter	T1	T2	T3	T4	T5	SEM
Final Weight (g)	1977.7^{a}	1986.0^{a}	2033.2^{a}	1907.0^{a}	1675.1^{b}	37.57
Weight gain (g)	1399.4^{a}	1435.4^{a}	1504.7^{a}	1356.9^{ab}	1191.4^{b}	34.01
Feed Intake (g)	4172.0^{b}	4268.2^{ab}	4240.8^{ab}	4507.7^{a}	4487.7^{ab}	49.17
FCR	2.99^{bc}	3.03^{bc}	2.83^{c}	3.32^{b}	3.79^{a}	0.09

Mean values with different superscript means they are significantly different (P>0.05)
T- Treatment, FCR – Feed Conversion Ratio, SEM – Standard Error of Mean

Conclusion and Recommendation

Dried cashew apple can be included in broiler feed up to 10% replacement for maize, however further study is required to establish the optimum level for best performance in broiler production.

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