

CARCASS AND ORGAN CHARACTERISTICS OF FINISHER BROILER CHICKENS FED VARYING LEVELS OF CASHEW (*Anacardium occidentale*) LEAF MEAL

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ABSTRACT

The quest for combating the present soaring cost of raising broilers has led to exploration into the use of leaf meal in feeding broilers. Different leaves possess different components and feeding exerts immense influence on the development of carcass and organs of broilers. A 4-week study was therefore undertaken to evaluate the effect of dietary inclusion of cashew leaf *Anacardium occidentale* meal (CLM) on the carcass and organ characteristics of finisher broiler chickens. One hundred and twenty Anak-2000 breed of finishing broilers were distributed randomly in a completely randomized design (CRD) of four treatments replicated three times. The experimental diets consisted of CLM levels of 0%, 1.5%, 2.5% and 3.5% in treatment 1 (control), 2, 3 and 4 respectively. The birds were managed under deep litter system and fed ad-libitum for 28 days. After which, the birds were slaughtered for carcass and organ assessment. The results showed no significant ($P>0.05$) difference in all the carcass and organ parameters examined except in breast muscle and back. In both parameters, there was a significant ($P<0.05$) drop in treatment 2 but leveled up to be similar ($P>0.05$) with the control at treatments 3 and 4. It was concluded that inclusion of CLM at 2.5 and 3.5% rates do not affect the carcass and organ characteristics of finisher broiler chicken and therefore could be adopted in the formulation of finisher broilers diets.

Keywords: Cashew leaf meal, Carcass, diet, Finishing broilers, Organs

INTRODUCTION

The exorbitant cost of feeding poultry which engulf up-to 75% of cost of production (Aderemi, 2020) has led to high production cost, low accessibility to poultry products and very low animal protein consumption of Nigerians (NIAS, 2024). This situation calls for concerted effort into its transformation. One of the efforts by Animal nutritionist to amelioration the condition has been the use of alternative feeds ingredients which is not in competition with human for feeding of broilers (Sugiharto, 2019). Most of these alternative feed ingredients though high in nutrient but their nutrient availability and transient to animals are low. The efforts to harness the efficiency of these ingredients has led to the adoption of feed additives such as probiotics, prebiotics, enzymes, amino acids, vitamins and naturally occurring additives which abound in leaves (Murwani, 2008). Different leave types have different levels of component (Sebola et al., 2019) hence have different influence on animal's system. One of the leaves of interest is Cashew (*Anacardium occidentale* L.). The plant is abundant in Nigeria and has been reported to possess high concentration of useful properties (Jinah et al., 2020). Feeding however, has been reported to exert immense influences on the development of carcass, organs and muscles in broilers (Biesek et al., 2020). Carcass quality is a major trait for assessment of broilers (Oshibanjo, 2010). The breast muscle of broilers is a vital part of carcass quality and has the highest significant economic impact in broiler value (Scheuermann et al., 2003) while examination of organs like the liver gives an insight into the toxicity level of the diet to which the birds were fed as enlarged liver has been attributed to high toxicity level of diet consumed by the bird during its life time (Ayhan et al., 2017). Different leaves type possesses different components (Sebola et al., 2020) hence could impact differently on broiler meat traits (Surghito et al., 2019). The present research therefore explored the effect of dietary inclusions of cashew leaf meal on the carcass and organ characteristics of finishing broiler chickens.

MATERIALS AND METHODS

The research was conducted at the Teaching and Research Farm, Department of Animal Health and Production Technology, Akanu Ibiam Federal Polytechnic, Unwana, Afikpo, Ebonyi State. Unwana is in the tropical rain forest zone of Nigeria.

Collection and preparation of the cashew leaf

Mature and greenish cashew leaves were harvested from cashew tree located within the farm premises. The leaves were sorted, cleaned, air dried under room temperature till they were crispy and malleable, milled in a hammer mill to obtain the cashew leaf meal (CLM), sample of which was analysed for chemical composition according to AOAC (2000) and then used to formulate the experimental diets.

Experimental Birds and Design

A total of 120 Anak 2000 breed of finisher broiler of 28 days post hatch with average weight of 1237.5g were used for the research. The broilers were randomly assigned to four (4) treatment groups in a complete randomized design (CRD) and replicated 3 times. The groups were T₁ which was the control group, T₂, T₃ and T₄. The groups were assigned to an experimental unit of 1m by 1m each and raised in a deep liter system. Feed and water were given *ad-libitum* and proper bio-security measures strictly followed. The feeding trail lasted for 28 days.

Experimental Diets, data collection and analyses

Four experimental diets were formulated for this research. Diet T₁ was the control which contained 0% CLM, in diets T₂, T₃ and T₄, CLM partly replaced Soybean meal and was added at 1.5%, 2.5% and 3.5% inclusion rates respectively. The percentage ingredient and the calculated nutrient composition of the experimental diets are shown in Table 1.

Table 1 Ingredients and Calculated Nutrient Composition of the Experimental Diets

Ingredients	Dietary levels (%)			
	T ₁ (0CLM)	T ₂ (1.5 CLM)	T ₃ (2.5CLM)	T ₄ (3.5 CLM)
Maize (yellow 9% CP)	54.00	54.00	54.00	54.00
Cashew leaf meal (14.53%CP)	0.00	1.50	2.50	3.50
Full fat SBM (38% CP)	15.00	13.50	12.50	11.50
Groundnut cake (45% CP)	12.00	12.00	12.00	12.00
Palm kernel cake (18%)	10.00	10.00	10.00	10.00
Fish meal (65%)	4.00	4.00	4.00	4.00
Lime stones	1.00	1.00	1.00	1.00
Bone meal	3.00	3.00	3.00	3.00
L-lysine	0.25	0.25	0.25	0.25
Di melthionine	0.25	0.25	0.25	0.25
**Vitamin & Min premix	0.25	0.25	0.25	0.25
Common salt	0.25	0.25	0.25	0.25
Total	100	100	100	100
Calculated nutrient composition of the diets				
Crude Protein (%)	20.36	20.01	19.77	19.54
Crude fibre (%)	4.06	4.01	3.97	3.94
Calcium (%)	1.70	1.69	1.69	1.69
Crude fat (%)	4.80	4.81	4.83	4.83
*Metabolizable energy (kcal/kg)	3093.26	3084.99	3079.48	3073.97

**To provide the following per kilogram of feed; vit A 10,000IU; vit. D3 1,500 IU; vit. E 2 mg; riboflavin 3 mg; pantothenic acid 10 mg; actinic acid, 2.5 mg; choline 3.5 mg; folic acid 1 mg; magnesium 56 mg; lysine 1 mg; iron 20 mg; zinc 50 mg; cobalt 1.25 mg. * *M.E of Cashew leaf meal was calculated according to* (Paunzega, 2007) $ME = 35 \times \% CP + 81.8 \times \% EE + 35.5 \times \% NFE$, where, *M.E* = metabolizable energy, *CP* = crude protein, *EE* = ether extract, *NFE* = nitrogen free extract.

At the end of the 28 days feeding, 3 broilers were randomly selected from each of the replicates for carcass and organ assessment. The broilers were starved for 12 hours prior to slaughter while water was provided. The broilers were weighed using sensitive digitalize weighing scale to obtain their live weight and then slaughtered by severing the jugular vein with a sharp knife. The carcass and organs were dressed, eviscerated, cut into parts and weighed. The weights obtained were expressed as a percentage of the live weight. Data obtained were subjected to analysis of variance (ANOVA). Treatment means were compared using Duncan Multiple Range test at an α -level of 0.05% significant level.

RESULTS AND DISCUSSION

The result of the carcass characteristics as presented in Table 2 showed significant ($P < 0.05$) effect for only the breast muscle and back in which birds fed treatment 2 diet had a significantly ($P < 0.05$) lower value compared to those fed the control diet. A similar result was obtained in the work of Martinez et al., (2021) in which there was an initial reduction in breast muscle weight though not significant enough but gradually increased as inclusion rate increased.

Table 2: Carcass characteristics of finisher broilers fed graded levels of cashew leaf meal

Parameters	Treatment levels (%)				SEM
	T ₁ (0.00CLM)	T ₂ (1.50CLM)	T ₃ (2.50CLM)	T ₄ (3.50CLM)	
Live wt (g)	2220.27	2250.33	2420.67	2720.33	0.20
Dressed wt (%lw)	88.53	90.63	90.03	92.57	2.12
Eviscerated wt (%lw)	82.47	78.17	81.30	82.90	3.00
Breast muscle (%lw)	24.97 ^a	22.57 ^b	23.13 ^{ab}	24.57 ^{ab}	0.93
Thigh & Drumstick (%lw)	21.17	21.8	21.83	21.87	0.80
Wing (%lw)	7.60	7.80	7.90	7.73	0.25
Head & Neck (%lw)	6.20	6.57	6.63	6.60	0.50
Shank (%lw)	3.40	3.50	3.87	3.23	0.37
Back (%lw)	12.90 ^a	10.27 ^b	10.70 ^{ab}	11.37 ^{ab}	1.05
Vent (%lw)	1.67	1.67	1.70	1.97	0.23

Note: Without superscript = not significant ($P < 0.05$). Means on the same row with different super scripts differ significantly. SEM = Standard error means. Wt = weight, %lw = percentage of live weight.

The result of the organ characteristics as presented in Table 3 showed no significant difference in all the parameters analysed. This is an indication that the leaf meal at up to 3.5% inclusion rate did not depress the organs of the broiler and aligned with the report of Daouda et al. (2023) and Martinez et al. (2021). The liver which is an organ for detoxification was not enlarged. Enlarged liver of birds has been attributed to consumption of diet that is toxic (Ayhan, 2017). The finding could be evidence that the diets were non-toxic to the broilers.

Table 3: Internal organ characteristics of finisher broilers fed graded levels of cashew leaf meal

Parameters	Treatment levels (%)				SEM
	T ₁ (0.00CLM)	T ₂ (1.50CLM)	T ₃ (2.50CLM)	T ₄ (3.50CLM)	
Heart (%lw)	0.22	0.23	0.19	0.16	0.03
Gizzard with content (%lw)	3.57	3.53	3.77	3.57	0.28
Liver & gallbladder (%lw)	2.33	2.13	2.20	2.07	0.16
Intestinal length (cm)	312.33	297.33	287.67	311.33	2.43

Note: Without superscript = not significant ($P < 0.05$). Means on the same row with different super scripts differ significantly. SEM = Standard error means. Wt = weight, %lw = percentage of live weight.

CONCLUSION

From the findings of the present research, it was concluded that CLM included in broiler finisher diets at 2.50 and 3.50% inclusion rate do not impact on the carcass and organ of the broilers. It is therefore recommended for inclusion in finisher broiler chicken diets.

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