

GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF BROILER CHICKENS FED VARYING LEVELS OF IRON TREE SEED MEAL (*Prosopis africana*)

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ABSTRACT

The research was conducted to investigate the growth performance and Carcass characteristics of Broiler Chicken fed varying levels of iron tree (*Prosopis africana*) seed meal. One-hundred (100) day old broiler chickens were randomly allocated to five experimental diets with inclusion levels of *Prosopis africana* seed meal at 0%, 3.49%, 7.58%, 12.42% and 18.25% designated as T1 (control), T2, T3, T4 and T5, respectively in a Completely Randomized Design (CRD) with 20 birds per treatment and each treatment was replicated two times with 10 birds per replicate. Results showed that there was significant difference in the final weight gain as well as total intake. The broiler fed control diet had the least value for both initial weight (0.26kg) and final weight (4.3kg) while the highest final weight of 4.65kg was recorded for broiler chickens fed 12.42% *Prosopis africana* (PASM). Feed intake was significantly ($P < 0.05$) lower in broiler chicken fed control diet (3637.89g) of which the highest feed intake was observed in broiler chicken fed both 7.5% and 18.25% PASM (3704.23 and 3802.23g), respectively. It was concluded that the dietary inclusion of up to 18.42% PASM in broiler chicken diet is beneficial as it shows a better and relatively improved feed intake, growth performance and carcass characteristics of the broiler chicken. Additionally, broilers chicken fed a diet supplemented with PASM at a rate of 7.58 showed the most promising results in terms of growth performance.

Keywords: *Prosopis*, Seed meal, Feed intake, Broiler Chicken, Body weight gain

INTRODUCTION

Mesquite or iron tree (*Prosopis africana*) is the only species of *prosopis* that is indigenous to Africa. The tree could be between 2-4m long characterized by a deep, fast growing tap root. *Prosopis africana* (PA) is found growing in the Savanna region of West Africa (Oyebamiji, *et al.*, 2022). Inadequate supplies of feed stuff at economic price continue to limit the production of animal protein in Nigeria. This is because the cost of animal feed account for 60% and 70% of the cost of production in poultry enterprise in Nigeria. Nutritionist and other professionals therefore, strive to reduce this cost to maximize profit (Priyaranjan, *et al.*, 2020). In Nigeria there is a wide gap between the production and consumption of animal protein and per capital animal protein intake is already below recommended levels (Ukachuckwu and Obioha, 2000),

MATERIAL AND METHODS

Experimental Site

The research was conducted at the Poultry Unit of the Department of Animal Health and Production School of Agricultural Technology Federal Polytechnic Bauchi, Bauchi State.

Source and processing of *Prosopis africana* seed

Prosopis africana seed meal was sourced locally from Lalaifido market of Shongom Local Government area, Gombe State. The seeds were processed by cooking for four hours and fermented for one week followed by shed drying before milling and incorporated accordingly into the experimental diets.

Experimental Birds, Design and Management

One-Hundred-day old broiler (Anak40) chicks were used for the research, the birds were randomly allocated to five experimental diets T₁ (control), T₂, T₃, T₄ and T₅ in a Completely Randomized Design (CRD) with 20 birds per treatment and each treatment was replicated two times with 10 birds per replicate. Feed and water were supplied ad libitum and the study lasted for 8 weeks. The composition of the experimental diets presented in Table 1.

Table 1: Composition of Broiler Diets Containing Graded level of Processed *Prosopis africana* Seed Meal.

SS	T ₁ Control (0%)	T ₂ (3.49%)	T ₃ (7.58%)	T ₄ (12.42%)	T ₅ (18.25%)
Maize	54.27	52.25	49.88	47.08	43.71
(Full fat soya bean)	25.93	24.46	22.7	20.70	18.25
<i>Prosopis</i> seed meal	0.00	3.49	7.58	12.42	18.25
Maize offal	10.0	10.0	10.0	10.0	10.0
Fish meal	5.0	5.0	5.0	5.0	5.0
Bone meal	3.0	3.0	3.0	3.0	3.0
Limestone	1.0	1.0	1.0	1.0	1.0
Methionine	0.15	0.15	0.15	0.15	0.15
Lysine	0.15	0.15	0.15	0.15	0.15
Mineral vitamin premix	0.25	0.25	0.25	0.25	0.25
Common Salt	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100

RESULTS AND DISCUSSIONS

Growth Performance of Broiler Chickens Fed Different Levels of Fermented Iron Tree (*Prosopis Africana*) Incorporated into the Diets. Table 2 shows the growth performance of broiler chickens fed fermented *Prosopis africana* seed meal (PASM) incorporated in the diets. Significant difference ($P < 0.05$) was observed in the final weight gain as well as total feed intake. The broiler fed control diet had the least value for final weight (4.31 Kg) while the highest final weight of 4.65Kg was recorded for broiler chicken fed 12.42% PASM. Feed intake was significantly ($P < 0.05$) lower in broiler chicken fed control diet (3.64kg) while the highest feed intake was observed in diets containing 7.58% and 18.25% PASM (3.09 and 2.8kg respectively) which is similar to the findings by Ausol and Mukhtar, 2011 and contrary to the findings of Abang *et al.*, 2023 who studied the performance of broiler chicks fed varying levels of *Prosopis africana* seed meal and pod meal respectively.

Table 2: Growth Performance of Broiler Chickens Fed Different Level of Fermented Iron Tree (*Prosopis Africana*) Incorporated Diets

Parameters	T ₁ (0%)	T ₂ (3.49%)	T ₃ (7.58%)	T ₄ (12.42%)	T ₅ (18.25%)	SEM
Initial Weight (Kg)	0.26	0.34	0.38	0.32	0.34	0.06 ^{NS}
Final weight (Kg)	4.31 ^d	4.60 ^b	4.58 ^b	4.65 ^a	4.36 ^c	0.06 *
Total Feed Intake(g)	3638.89 ^d	3683.23 ^c	3704.23 ^b	3671.23 ^b	3803.23 ^a	32.49*

a, b, c means with different superscripts on the same row differ significantly ($P < 0.05$)

SEM (Standard Error Mean)

Live weight and Carcass Characteristics of Broiler Chicken

Table 3 shows the relative live weight and carcass characteristics of broiler chickens fed various levels of fermented *Prosopis africana* seed meal (PASM) incorporated into broiler diets. Feeding of the birds caused no significant ($P > 0.05$) increase in the weight of the small intestine, head (at 7.5% PASM), liver (12.42% PASM), kidney (both 7.5% and 12.42% PASM), small intestine length (at 7.5% PASM), large intestine weight (3.49% and 7.5% PASM), large intestine length (at both 7.5% and 12.42% PASM), caecum length (12.42% PASM), abdominal (at 12.42% PASM), thigh weight (3.49% and 7.5% PASM), drumstick (3.49% and 7.5% PASM) and neck (3.49%,

7.5%, 12.42% and 18.25% PASM). However, the broiler chicken fed the control feed (T1) had the highest recorded value for the weight of lungs (11.40g), small intestine (1.62g), caecum weight (22.15g), heart (11.05) and gizzard (55.40g). This agreed with the findings of Ausol and Mukhtar (2011). However, the dressing percentage values in present study disagreed with that of Nuhu *et al.*, 2013 who used decorticated fermented *Prosopis africana* seed meal.

Table 3: Relative weight and Carcass Characteristics of Broiler Chicken fed Different Level of Fermented Iron Tree (*Prosopis africana*)

Parameters	T1(0%)	T2 (3.49%)	T3 (7.58%)	T4 (12.42%)	T5 (18.25%)	SEM
Live weight (kg)	2.40 ^a	2.20 ^b	2.05 ^c	2.10 ^c	1.85 ^d	0.28*
Dressing %	70.8 ^b	68.18 ^c	58.53 ^d	66.66 ^c	81.08 ^a	0.28*
Eviscerated weight (kg)	1.75 ^a	1.50 ^b	1.20 ^d	1.40 ^c	1.50 ^b	0.28*
Head(g)	52.25	52.20	55.80	51.80	50.65	2.48 ^{NS}
Liver(g)	39.95	36.10	37.85	44.40	31.25	9.48 ^{NS}
Kidney(g)	0.50	0.50	0.65	0.65	0.45	0.07 ^{NS}
Lungs(g)	11.40	9.75	9.75	8.10	8.65	1.91 ^{NS}
Small Intestine(cm)	162.50	156.00	152.00	167.50	149.50	31.82 ^{NS}
Small Intestine(g)	55.80	52.25	53.90	51.50	48.55	4.31 ^{NS}
Large Intestine(cm)	10.35	16.05	16.10	10.30	7.55	2.12 ^{NS}
Large Intestine(g)	48.00	46.75	52.50	51.00	40.50	6.75 ^{NS}
Caecum Length(cm)	33.00	33.25	23.70	35.00	31.00	4.25 ^{NS}
Caecum weight(g)	22.15	20.55	17.05	19.20	17.75	3.89 ^{NS}
Heart Weight(g)	11.05	10.10	9.45	10.05	10.65	2.19 ^{NS}
Gizzard Weight(g)	55.40	40.80	41.40	46.35	46.05	12.52 ^{NS}
Abdominal Weight(g)	252.95	251.50	243.70	267.80	210.50	13.58 ^{NS}
Thigh Weight(g)	238.35	255.05	249.30	229.00	211.05	13.58 ^{NS}
Drumstick Weight(g)	220.80	221.50	223.60	197.65	200.05	30.41 ^{NS}
Neck Weight(g)	91.35	146.30	91.25	89.25	93.00	7.59 ^{NS}

a, b, c means with different superscripts on the same row differ significantly ($P < 0.05$) SEM (Standard Error Mean)

CONCLUSION AND RECOMMENDATION

The inclusion of *Prosopis africana* seed meal in broiler chicken diets in this study increased live weight, feed intake and improved dressing percent. This study recommends inclusion of *Prosopis africana* seed meal in broiler feed at 18.25%.

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