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PERFORMANCE AND CARCASS CHARACTERISTICS OF BROILER FINISHER CHICKEN FED GRADED LEVELS OF *ZIZIPHUS-MAURITIANA FRUIT MEAL*

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ABSTRACT

An experiment was conducted to investigate the replacement of maize **with Ziziphus-Mauritiana** fruit meal in broiler finisher diet. One hundred and twenty anak 2000 broiler were used for the study, four diets were formulated using ZMFM at 0%, 5%, 10% and 15% in the diets respectively. The birds were randomly allotted to dietary treatment in a completely randomized design. Each treatment consists of thirty birds with ten birds per replicate. The experiment lasted for four weeks. Feed and water were given ad-Libitum. Data were collected on daily feed intake, average daily weight gain, feed conversion ratio (FCR) and carcass characteristics were also measured. Result revealed that broiler finisher fed 5% (ZMFM) were statistically higher ($P<0.05$) in final weight than the birds fed 10% and 15% of the diet. The weight of the birds on control diet was slightly lower than that fed 5% diet. Result of average daily weight gain proved that at increasing levels of (ZMFM) the birds did not follow the trend of weight gain ($P<0.05$) although the birds fed 5% (ZMFM) gained more weight. Results also showed that average daily feed intake did not differ ($P<0.05$) significantly between the birds fed the different levels of (ZMFM) and the control diets. Feed conversion ratio (FCR) of broiler finisher differ ($P<0.05$) significantly among the different6 treatment levels. However, no mortality was recorded. Results of carcass characteristics of broiler finisher fed graded levels of (ZMFM) revealed significantly ($P<0.05$) differences in live weight, dressed weight, and thigh, drumstick and leg percent. However, the eviscerated weight, breast, back, wings, neck, head percent of live weight were not significantly ($P<0.05$) different. Visceral organs of birds were statistically ($P<0.05$) different in lungs percent of live weight, while all other visceral organs measured were not different.

It was concluded that (ZMFM) can replace maize at 5% for better performance of broiler finisher.

Keywords: Performance, Carcass, Ziziphus-Maritiana Fruit Meal, Broiler Finisher.

INTRODUCTION

Expansion of the poultry industry depends to a large extent on the availability of good quality feeds in sufficient quantity at affordable price favorable to both the producers and consumers alike can afford. This is particularly important for intensive poultry enterprise where performance depends almost entirely on the use of balanced rations. The high cost of conventional sources of protein and energy is largely responsible for the present high price of finished feeds. Thus the potential value of non-conventional feed sources and their maximum inclusion rate in diets depends on their nutritive value, their safety for animal health and availability to farmers. Nigeria is still confronted with the problem of proper feeding of livestock species because of the competition between man and animal for the conventional protein energy feed stuff. *(Agbede et al, 2002).*

One of the several non-conventional feed resources available is the *Ziziphus-Mauritania* fruit meal. *Ziziphus Mauritania* wild (Rhamnacea) locally known as Jujube, Magaryarkurna (Hausa) is a tropical evergreen tree which grows in the East and West Africa, Nigeria (Adeyemi, 2010). The fruit taste like a mixture of dates and apples. The Fruit can be eaten raw or dried and has a pleasant sub-acid taste. Somewhat resembling dried apples (Keita, 2017). The Food from this plant is an important source of energy, protein and mineral (Afalogen et al; 2002). The Fruit contains 83.98% carbohydrate, 19.89% crude protein

and 1.67% fiber (Keita, 2017). This Experiment was carried out to investigate the effect of replacing maize with graded levels of *Ziziphus-Mauritania* fruit pulp meal on performance and carcass characteristics of broiler finisher chicken.

MATERIALS AND METHODS

Study Area

The Experiment was conducted at the Teaching and Research farm of College of Agriculture, Jalingo. Taraba State which is located between latitude $8^0$30"North and longitude $11^0$50"East in Guinea Savannah Zone of North Nigeria.

Ziziphus-Mauritiana Fruit Meal Preparation

The *Ziziphus-Mauritania* fruits were obtained from the local market and bushes within Ardo-Kola Local Government of Taraba State, the dry fruits were pounded to separate the pulp from the hard kernel. The pulp was thoroughly sundried, ground into meal and packed in a polythene bag and stored at room temperature for formulation of the experimental diets. Proximate analysis of the *Ziziphus-Mauritiana* fruit meal was carried out according to the procedures of A.O.A.C (1995) to determine the crude protein, crude fibre, ether extracts and gross energy.

Table 1: Proximate composition of *Ziziphus-Mauritania*. Fruit Meal:

Nutrient	%
Dry Matter (DM)	94.00
Crude Protein (CP)	19.27
Crude Fibre (CF)	17.00
Ether Extract (EE)	5.00
Ash	5.00
Nitrogen free extract (NFE)	53.73
M.E (Kcal/kg)	3025.40

Experimental Diet

Four experimental diets were formulated containing *Ziziphus-Mauritania* fruit meal at 0%, 5%, 10%, and 15% and were designated diets T_1, T_2, T_3 and T_4, respectively. (Table 2)

Table 2: Ingredients composition of Broiler finisher diets.

Ingredients	T_1	T_2	T_3	T_4
Maize	46.45	41.45	36.45	31.45
ZMFM	0.00	5.00	10.00	15.00
Wheat Offal's	11.61	11.61	11.61	11.61
Soya Beans Full Fat	37.44	37.44	37.44	37.44
Bone Meal	3.25	3.25	3.25	3.25
Limestone	0.20	0.20	0.20	0.20
Methionine	0.20	0.20	0.20	0.20
Lysine	0.25	0.25	0.25	0.25
Salt	0.35	0.35	0.35	0.35
Premix	0.25	0.25	0.25	0.25
Total	**100**	**100**	**100**	**100**

Calculated Analysis:

Crude Protein (CP)	20.16	19.93	19.72	19.49
Crude Fibre (CF)	4.28	4.38	4.22	4.18
Ether Extract (EE)	9.17	9.01	8.85	8.69
Ash	3.06	3.15	2.26	3.35
Nitrogen Free Extract (NFE)	63.33	63.53	63.95	64.29
M.E (Kcal/Kg)	3.050	3.084	3.034	3.017

ME: Metabolizable Energy
ZMFM: *Ziziphus-Mauritania* Fruit Meal.

Premix (Grow fast manufacture by animal care services consults (Nig.) Ltd Vit. A3200.000IU; Vit. D_3, 640.000IU; Vit. E, 2.000IU; Vit. K, 800mg; Thiamine B, 600mg; Riboflavin B_2 1.600mg pyridoxine, B 6.600mg Niacin 6.000mg; Vit. B_{12} 4mg; Pantothenic Acid 2.000mg: Folic Acid: 2.000mg Biotin 8mg: Choline chlorine 80g; Antioxidant 50g: Magnase, 32g. Zing 20g, Iron 89, Copper 29, Iodine 0.48g, Salenium, 80mg and Cobalt 80mg.

Experimental Animal and Management

A Total of one hundred and twenty broiler finisher were sourced from a commercial farm in Jalingo and allocated to four dietary treatments of 10 birds per replicate and replicated 3 times. All Vaccination schedules and management procedure were followed. Feed and water were provided ad-Libitum and the experiment lasted for 28 days after an initial adjustment period of one week daily feed intake was monitored and weight gain also measured, as well as feed conversion ratio (FCR) determined.

Carcass and Internal Organs Evaluation

At the end of the 4 weeks experiment, three birds were randomly selected from each replicate and the average weight values in each of the replicates *vis a vis* treatment were used for carcass evaluation. The birds were weighted before they were slaughtered by exsanguinations and live weights recorded. The slaughtered birds were then submerged in hot water at a temperature of between 53-54^{oc} (plucking temperature) for 2-3 minutes to loosen the feathers. Eviscerated weight and dressed weight were taken individually before cutting into different parts as follows: breast, back, wing, thing, drumstick, neck, head, kidney, gizzard, liver, spleen and lung.

Data Analysis

All data generated from the experiment were subjected to one way analysis of variance using SAS software (SAS, 2009), means were separated with Duncan multiple range test at 5% levels of significance.

Result and Discussion

The result of calculated analysis and nutrient composition of the experimental diet are presented in Table 2. The crude protein (CP) values ranged from 19.49–20.16 in the finisher diets. While the crude fibre, ether extract, and nitrogen free extract value ranged from 4.18 – 4.28, 8.69 – 9.17 and 63.33–64.29 respectively. The values are within the normal range for broiler production in tropics recommended by NRC (1984). Metabolizable Energy value of the diets ranged from 3.017 – 3084 Kcal/Kg, and these values are slightly higher than 3000 kcal for broiler finishers in the tropics (Aduku and Olukosi, 1992).

Although there are small variation in the nutrients composition of the experimental diets, but the nutrient content of the diets fall within the minimum requirement of broiler in the tropics as reported by (Oluyemi and Robert, 2000).

Table 3: Growth performance of broiler finisher fed graded levels of *Ziziphus-Mauritania* fruit meal.

PARAMETRE (g)	0%	15%	10%	15%	SEM
Initial weight	95.41	104.30	95.58	102.00	2.55
Final Weight	2038.90[a]	2156.10[a]	1762.58[b]	1646.38[b]	71.29
Total Weight	2040.51[a]	2050.78[a]	1667.90[b]	1541.37[b]	72.62
Gain					
Average Daily	35.51	35.56	30.91	29.90	1.27
Weight gain					
Total feed consumption	5078.10	5081.29	5087.28	4890.58	84.20
Average daily feed intake	91.33	92.42	90.82	87.58	1.52
F C R	2.56[b]	2.61[b]	3.04[a]	3.02[a]	0.09
Mortality	0.00	0.00	0.00	0.00	1.24

FCR: Feed Conversion Ratio.

ab: *Means with same superscript along the same row are not significantly different (P<0.05).*

The results on performance of broiler finisher fed various experimental diets are presented in Table 3: The birds had slightly similar body weight as initial weight. The final body weight decreased with increased levels of ZMFM.

The broiler finisher fed 5% ZMFM were statistically higher (P<0.05) in final body weight than the broilers fed 10%, 15% levels of the diet. The weight of birds on control diets was slightly lower than that fed 5% diet. The superior performance

of the broiler finishers fed 5% ZMFM corroborated the report of Keita, (2017) where graded levels of *Ziziphus-Mauritania* seed meal were fed to broiler finishers and recorded linear decrease in final body weight across the treatment at increasing levels of *Ziziphus Mauritania* Seed Meal. Result of average daily weight gain proved that at increasing levels of ZMFM the broiler finishers did not gain weight ($P>0.05$) although broiler finishers fed 5% ZMFM had the higher weight gain.

However, results of average daily feed intake did not differ ($P>0.05$) significantly between the broiler finishers fed the different levels of ZMFM and the control diet. It was observed that feed intake reduced as the inclusion levels of ZMFM increased. The downward trend in feed intake might be due to the birds consuming enough feed for the body as they eat for the maintenance of the body. This corrugated the results of Abeke et al; (2003). The average daily feed intake ranged from 87.58-92.42 (T_2). These values were higher than those obtained by Mufwa et al, (2020) as average daily feed intake when fed *Ziziphus-Mauritiana* seed meal to broiler finisher. The higher value of average feed intake obtained in this study could be due to processing methods used which reduced the effect of anti-nutrient in the diet, the result of feed conversion ratio (FCR) differ ($P<0.05$) significantly among the birds fed different treatment levels of the diets. However, no mortality was recorded when the birds were fed the different levels of diet.

Tables 4: Carcass characteristics of broiler finisher fed graded levels of *Ziziphus-Mauritiana* fruits meal.

Parameters (g)	0%	5%	10%	15%	SEM
Live % (g)	2209.30[a]	2331.28[a]	2032.31[b]	1855.71[b]	54.61
1 Ewt %	80.28	80.11	81.33	79.14	0.41
1 Dwt %	72.78[a]	73.37[ab]	73.81[a]	70.69[b]	0.52
2 Breast %	25.35	24.41	25.61	24.25	0.50
2 Back %	19.61	17.15	18.42	17.48	0.40
2 Wing %	10.75	11.24	10.81	11.35	0.15
2 Thigh %	15.25[ab]	15.32[a]	14.41[b]	15.25[ab]	0.23
2 Drumstick%	12.86[b]	14.01[a]	13.44[ab]	13.67[ab]	0.23
2 Neck %	6.41	5.42	5.30	5.88	0.31
2 Head	3.80	3.73	3.49	3.81	0.14
2 Leg %	5.51[b]	6.68[a]	5.39[b]	6.44[a]	0.16
3 Kidney %	0.73	0.68	0.55	0.63	0.04
3 Gizzard %	4.31	4.11	4.27	4.61	0.11
3 Heart %	0.70	0.88	0.81	0.74	0.11
3 Lungs %	0.72[b]	0.94[a]	0.75[b]	0.74[b]	0.02
3 Liver %	2.52	2.63	2.68	3.01	0.09
3 Spleen %	0.15	0.14	0.15	0.14	0.11

ab: Means with the same subscript along the same row are not significantly different (P<0.05).
EWT: Eviscerated weight.
DWT: Dressed weight.
1: Expressed as % of live weight.
2: Expressed as % of eviscerated weight.
3: Expressed as % of dressed weight.

The result of the carcass characteristics of broiler finisher fed graded levels of ZMFM (Table 4) shows significantly (P<0.05) differences in live weight, dressed weight, thigh, drumstick and leg percent. However, the eviscerated weight,

breast, back, wing, neck, head percent of live weight were not statistically (P>0.05) different. The results of visceral organs of broiler finishers fed ZMFM (Table 4) were statistically (P<0.05) different in lungs percent of live weight, while all other visceral organs measured were not different. An increase in lungs percent could be as a result of high activity of anti-nutrient on this organ although no possible attended illness was found with the birds as suggested by Keita (2017). The author fed *Ziziphus Mauritania* seed meal to broiler finisher.

CONCLUSION

Ziziphus Mauritania fruit meal has been demonstrated to be utilized as an energy sources in broiler diets to replace maize up to 5% inclusion level, without any advance effect on performance and carcass characteristics. However, studies on its implication on the blood parameter of the birds should be further investigated.

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