EVALUATION OF TWO MILLING WASTES ON THE GROWTH PERFORMANCE OF BROILER CHICKENS WITH AND WITHOUT NUTRIZYME

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ABSTRACT

A feeding trial was conducted to determine the effect of two milling waste (maize offal and wheat offal) with and without nutrizyme on the performance of broiler chickens at both starter and finisher phase. One hundred and thirty-five-day old Ross broiler chickens were randomly allotted to five dietary treatments in completely randomized design. Five experimental diets were formulated and coded as T1, T2, T3, T4 and T5. The inclusion levels for maize offal and wheat offal at the starter and finisher phases were 17% and 22%, respectively. Birds were housed for eight weeks in deep litter system and fed ad-libitum. Data collected were weight gain, feed intake, feed conversion ratio and feed cost per kg gain. The result of the experiment at starter phase shows significant ($p<0.05$) difference in weight gain, final weight and feed conversion ratio. At finisher phase feed intake and feed conversion ratio shows significance ($p<0.05$) difference across all treatment. Nutrizyme supplementation of fibre diets improved weight gain, feed conversion ratio and reduced feed cost significantly ($p<0.05$) at the finisher phase. Therefore, it was recommended that Up to 17% maize offal (T1) can be incorporated in broiler chicks diet because it had the highest final weight, weight gain, improved feed conversion ratio and reduced feed cost per kg gain and Up to 22% maize offal and wheat offal supplemented with nutrizyme at finisher phase can be added in broiler chicken diet to replace maize for improved weight gain, feed intake, better feed conversion ratio and reduced feed cost per kg gain.

Key words: maize offal wheat offal, performance, nutrizyme

INTRODUCTION

Cereal grains constitute the major source of energy in poultry diet in the tropics, maize has remained the chief source of energy in compounded diet and it constitute about 50% inclusion level of poultry ration (Ajaja, *et al*., 2002). Due to the high cost of feed resulting from high cost of cereal and grains, it has necessitated the use of alternative feed ingredients that are cheaper and locally available. This among others includes milling waste such as maize offal and wheat offal. Wheat offal has been abundantly available in Nigeria in recent times, the value of wheat offal in feeding livestock had long be recognized. Maize offal is a by-product of maize milling processes. Vantsawa, (2001) report that maize offal can replace all the maize in broiler starter and finisher diets without any adverse effect on performance. Supplementation of enzymes has become common additive to monogastric diets to improve nutrient utilization of feed (Adesehinwa, 2007). Therefore, the objective of this study was to evaluate the growth performance and feed cost per kg gain of broiler chickens fed diet containing two different milling wastes (maize offal and wheat offal) with and without nutrizyme supplementation at both starter and finisher phase.

Materials and Methods

Location of the Experiment

The research was carried out at the poultry unit of the Teaching and Research Farm, Faculty of Agriculture Kaduna State University, Kafanchan Campus, Kaduna State, Nigeria.

Experimental Diets

Five experimental diets were formulated and coded as T1, T2, T3, T4 and T5. T1 (control diet) was devoid of the milling waste products, T2 contained maize offal without nutrizyme, T3 contained wheat offal without nutrizyme, T4 contained maize offal with nutrizyme and T5 contained wheat offal with nutrizyme. Wheat offal and maize offal was included in the starter diets at 17% each as shown in Table 1, while in the finisher diet 22% maize offal and wheat offal was included each as shown in Table 2.

Table 1: Percentage composition of broiler starter diets

Ingredients	T1 (control)	T2 17%M.O	T3 17%W.O	T4 17%M.O + Enzyme	T5 17%W.O + Enzyme
Maize offal	0.00	17.00	0.00	17.00	0.00
Wheat offal	0.00	0.00	17.00	0.00	17.00
Maize	52.10	35.10	35.10	35.10	35.10
Full fat soya	12.50	22.30	22.30	22.30	22.30
Soya cake	31.00	21.20	21.20	21.20	21.20
Limestone	0.50	0.50	0.50	0.50	0.50
Bone meal	3.00	3.00	3.00	3.00	3.00
Salt	0.25	0.25	0.25	0.25	0.25
Vitamin premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0.10	0.10	0.10
Methionine	0.3	0.3	0.3	0.3	0.3
Nutrzyme	0.00	0.00	0.00	0.04	0.04
TOTAL	**100**	**100**	**100**	**100**	**100**
Calculated Analysis%					
Crude protein (%)	23.35	23.01	23.19	23.01	23.18
ME (Kcal/kg) (%)	2958.59	2900.84	2982.44	2900.84	2982.44
Ether extract (%)	6.31	7.45	7.09	7.45	7.09
Crude fibre (%)	4.41	5.54	4.18	5.54	4.18
Cacium (%)	1.06	1.07	1.07	1.07	1.07
Available protein (%)	0.52	0.54	0.53	0.54	0.53
Lysine (%)	1.41	1.39	1.39	1.39	1.39
Methinine+cyst (%)	0.99	0.96	0.98	0.96	0.98

M.O= maize offal; W.O= wheat offal; ME= Metabolizable energy; cys= cysteine

Table 2: Percentage composition of broiler finisher diets

Ingredients	T1 Control	T2 22%M.O	T3 22%W.O	T4 22% M.O + Enzyme	T5 22%W.O + Enzyme
Maize offal	0.00	22.00	0.00	22.00	0.00
Wheat offal	0.00	0.00	22.00	0.00	22.00
Maize	61.60	39.50	39.50	39.50	39.50
Full fat soya	9.00	19.70	19.70	19.70	19.70
Soya cake	25.00	14.40	14.40	14.40	14.40
Limestone	0.50	0.50	0.50	0.50	0.50
Bone meal	3.00	3.00	3.00	3.00	3.00
Salt	0.25	0.25	0.25	0.25	0.25
Vit premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0.10	0.10	0.10
Di methionine	0.30	0.30	0.30	0.30	0.30
Nutrizyme	0.00	0.00	0.00	**0.40**	**0.40**
TOTAL	**100**	**100**	**100**	**100**	**100**
Calculate Analysis%					
Crude protein (%)	20.27	20.00	20.22	20.00	20.22
ME (kcal/kg) (%)	3025.35	2922.15	3037.75	2922.15	3037.75
Ether extract (%)	5.64	6.89	6.43	6.89	6.43
Crude fibre (%)	3.93	5.46	3.67	5.46	3.70
Calcium (%)	1.039	1.06	1.05	1.06	1.05
Lysine (%)	0.51	0.53	0.52	0.53	0.52
Met + cyst (%)	1.18	1.16	1.16	1.16	1.16

Experimental Design and Management of Birds

One hundred thirty-five (135) day old ross broiler chicks where randomly allotted into five (5) dietary treatment groups (having 27 birds per treatment) replicated 3 times with each replicate having 9 birds in a completely randomized design. Vaccination and other routine poultry management practices were carried out. Birds were offered experimental starter diets for the first four weeks followed by experimental finisher diets for last four weeks.

Statistical analysis

All data collected were subjected to one-way analysis of variance (ANOVA) as outlined by Daniel (1995) with the aid of SAS (2004) and the significant means separated by Duncan's multiple range test (Steel and Torrie, 1980).

RESULT AND DISCUSSION

The result obtained for both starter and finisher phase is presented in Table 3 and 4 which shows that there was a significance difference ($p<0.05$) among treatment group in the IWT, FWT, WTG, DWTG, and FCR at starter phase, FI and FCR at finisher phase. At starter phase final weight gain was higher in the control diet (1148) which did not significantly differ much with T2 (maize offal) which agrees with the report of (Doma, 2020) that maize offal could replace maize up to 20% level in diets of broiler chicken without compromising performance, birds fed in T5 and T3 had the lowest final weight compare to T2 and T1 while at finisher phase FWT, WTG DWTG shows no significance difference across all the treatment group. FCR shows significant ($p<0.05$) different across all the treatment groups both at starter and finisher phase, Superior value of 1.36 and 1.85 was recorded in T1(starter and finisher respectively) while inferior value of 1.66 and 2.57 was recorded in T3 (starter and finisher respectively), at finisher phase better feed conversion ratio recorded for birds fed with nutrizyme supplementation (T4) is in agreement with the report of (Tuleun *et al*., 2001) that maize offal supplemented with enzyme makes nutrient more available, efficiently digested and utilized by the birds.

Table 3. Growth Performance of Broiler Chicks Fed Diets Containing Maize Offal and Wheat Offal with and Without Nutrizyme (0 – 4 weeks)

Parameter	T1 (control)	T2 (M.O)	T3 (W.O)	T4 (M.O+ Nutrizyme)	T5 (W.O + Nutrizym)	SEM
IWT	37.85^{b}	37.67^{b}	39.56^{a}	38.37^{ab}	38.44^{ab}	0.45
FWT	1148.15^{a}	1111.11^{ab}	981.48^{b}	1074.07^{ab}	955.56^{c}	13.46
WTG	1110.30^{a}	1073.44^{ab}	941.93^{b}	1035.70^{ab}	917.11^{c}	13.41
DWTG	39.65^{a}	38.34^{ab}	33.64^{c}	36.99^{b}	32.75^{c}	0.48
FI	1506.96	1518.00	1560.07	1464.81	1488.70	38.31
DFI	53.82	54.21	55.717	52.32	53.17	1.37
FCR	1.36^{a}	1.41^{a}	1.66^{b}	1.41^{a}	1.62^{b}	0.03
FC (₦/kg)	274.55	258.08	259.10	265.28	266.30	
FC/kg G (₦)	373.38	363.89	430.11	374.04	431.41	

IWT = initial weight, FWT = final weight, WTG = weight gain, DWTG = daily weight gain, F I= feed intake, DFI =daily feed intake, FCR = feed conversion ratio, M.O = maize offal, W.O = wheat offal, SEM = standard error mean, FC = feed cost

At finisher phase Wheat offal without nutrizyme (T3) has the highest feed intake while the control diet recorded the lowest. This could be attributed to low energy and high fibre content of the offals, starter phase FI shows no significance ($p>0.05$) difference across the treatment groups. At starter phase feed cost/kg gain in the experimental diets was highest in T5 (₦431.29) and the lowest was observed in T2 (₦363.89). This show that maize offal in the starter phase significantly reduced feed cost thereby maximizing profit. While at finisher phase Feed cost/kg gain was highest in T3 (₦601.51) and lowest in T4 (₦ 460.45, This shows that maize offal with nutrizyme supplementation

in the finisher phase significantly reduced feed cost thereby maximizing profit which shows that inclusion of enzyme in poultry diet resulted in reduced feed cost per kg gain.

Table 4: Growth Performance of Broiler Chicks Fed Diets Containing Maize Offal and Wheat Offal with And Without Nutrizyme (5 - 8 weeks)

Parameter	T1(control)	T2(M.O)	T3(W.O)	T4 (M.O + Nutrizyme)	T5 (W.O + Nutrizyme)	SEM
IWT	1148.15^{a}	1111.11^{ab}	981.48^{c}	1074.07^{b}	955.56^{c}	13.46
FWT	2796.30	2666.70	2444.40	2666.70	2444.40	115.94
WTG	1648.10	1555.50	1463.00	1592.60	1488.90	111.00
DWTG	78.48	74.07	69.67	75.84	70.90	5.29
FI	3051.90^{b}	3151.90^{b}	3698.10^{a}	3007.40^{b}	3340.70^{b}	109.5
DFI	145.36^{b}	150.09^{b}	176.10^{a}	143.21^{b}	159.08^{b}	5.21
FCR	1.85^{a}	2.06^{a}	2.57^{b}	1.89^{a}	2.24^{ab}	0.13
FC (₦/kg)	257.06	236.06	237.35	243.23	244.55	
FC/kg G (₦)	475.56	486.28	609.99	459.70	547.79	

CONCLUSION AND RECOMMENDATION

From this study it is concluded that broiler chickens at starter phase fed up to 17% maize offal with and without enzyme supplementation had improved weight gain (1073.44), lower feed intake (359.78), better FCR and reduced feed cost per kg gain (₦359.78), Maize offal and wheat offal supplemented with nutrizyme at 22% inclusion level at the finisher phase shows increased in performance: lower feed intake, increase, higher weight gain, better feed conversion ratio and lower feed cost per kg gain than those without enzyme in the experimental diets (T2 and T3). though 22% maize offal supplemented with nutrizyme had better final weight, weight gain, lower feed intake, better FCR and reduced feed cost/kg gain (₦460.45) Therefore, it is recommended that up to 17% maize offal can be incorporated in broiler chicken starter diet and 22% maize offal supplemented with nutrizyme at finisher phase.

REFERENCES

Adesehinwa, A.OK. (2007). Bulg Journal of Agricultural Science. 13: 593-600. Cited in Adesehinwa, A.O.K. Omojola, B-Obi, O.O., Adesina, M.A. and Oluwole, O. (2009). The effect of Allzyme® SSF Supplementation on rice mill by-product based diet on the performance and carcass characteristics of finishing pigs. Proc. 14th Annual ASAN held at Lautech Ogbomoso 1417th September

Ajaja, K., J.O. Agbede and V.A. Aletor (2002) Replacement Value of sorghum dust for maize in diets for broiler-chicks. In processing of 2nd Annual Conference of Nigerian Society for Animal Production, March 17 – 21, pp. 109 – 112.

Daniel, W. W. (1995). Biostatistics. 6th edition New York: John Wiley and Sons.

Doma U.D (2020). Growth Performance, Carcass Characteristics and Financial Benefit of Broiler Chickens Fed Dietary Levels of Maize Milling Waste as Replacement for Maize Nigerian Journal of Animal Science and Technology Nigeria. *Journal Animal Science Technology.* Vol. 3 (2):1 - 10

SAS., (2004). SAS/STAT user guide: Statistics, Version 8.1, SAS. Inc; Cary, Nc, USA.

Steel. R. G. A. and Torrie, J. R. (1980). Principle and Procedure of statistics. Mc Gram-Hill Book Company Inc. New York, Toronto and London.

Tuleun, C.D., P.C. Njoku and I. D. I. Yaakugh (2001). The performance of growing pullet fed Roxazyme in rice offal-based diets. Proc. of the 26 Annual Conference Animal Science Association of Nigeria, Zaria, 219-221.