

EFFECTS OF REPLACING MILLET OFFAL WITH MAIZE MILLING RESIDUE ON THE PERFORMANCE OF BROILER STARTER CHICKS

*Yusuf S.Z.¹, Kawu Y.U.² Bah, U.J.³ K. M. Bello⁴ and Doma, U. D.⁴

¹ Department of Animal Science and Range Management, School of Agriculture and Agricultural Technology, Modibbo Adama University of Technology, Yola, Nigeria

² Department of Agric. Technology Federal Polytechnic Damaturu Yobe State, Nigeria

³ Department of Animal Science Faculty of Agriculture Ahmadu Bello University Zaria Nigeria

⁴ Animal Production Programme, Abubakar Tafawa Balewa University, Bauchi, Nigeria

Corresponding Author- Email dbanuzubair@gmail.com

ABSTRACT

The experiments was conducted to evaluate the performance of broiler starter fed different levels of maize milling residue (MMR) as replacement for millet offal (MO) at graded levels of 0, 25, 50, 75 and 100%. Two hundred broiler chicks were randomly assigned to five dietary treatments in a completely randomized design with forty birds per treatment (four replicates). Feed and water were offered ad-libitum. The feeding trials lasted for four weeks. The results of the daily feed intake (DFI) were similar across the dietary treatment. The DFI ranges from 69.26-73.10g. The highest value was obtained on diet 4 (75% MMR) and lowest on diet 1 (0% MMR). No significant dietary effect was observed in daily weight gain (DWG) across the treatment groups. Similarly no significant dietary effect observed among the treatments on feed conversion ratio (FCR). However, FCR was better in diet 1 (0% MMR). Based on the results obtained, MMR can completely (100%) replace millet offal (MO) as dietary fibre source for feeding broiler starter with no negative effects on performance.

Key words: Broilers Starter, Millet offal, Maize milling residue, Performance.

INTRODUCTION

Nowadays, one of the most important nutritional problems in most developing countries is that of inadequate protein intake, more especially that of animal origin (Fielding, 1991). Animal protein contains the essential amino acids which are more balanced and readily available to meet human nutritional needs than plant proteins. FAO (1986) asserted that out of 45.0 g total protein consumed by an average Nigerian, only 7.0 g comes from animal sources. This low protein intake has been attributed to low level of animal production and high cost of animal products. The consequences of this low protein intake are retarded growth, high incidence of kwashiorkor, high rate of child mortality, short life-span and wide-spread protein-energy malnutrition.

Therefore the need for increase in animal production is absolutely critical and this can be achieved by producing highly productive animals with short generation intervals like broilers, rabbits and pigs. These animals are known to have high fecundity, short generation interval and fast growing rate (Yusuf *et al* 2015). Despite their rapid rate of multiplication, one of most important constrain in producing monogastric animals is the high cost of production due to high cost of feed which discouraged many farmers from engaging in poultry business. The situation has drawn the attention of nutritionist, scientist and agriculturist to the need for research in to the use of simple agro-industrial by-product that are not staple food for man to meet the nutritional needs of the monogastric. If this is achieved, it would lower the cost of production and consequently lead to availability and affordability of animal protein for the increasing human population of Nigeria (Yusuf *et al.* 2019).

One of the agro-industrial by-products that are cheap and available all year round throughout the tropical region is maize milling residue (MMR). MMR is suitable in formulating broiler diets as a source of fibre and to some extent can provide a reasonable amount of energy in the diets. MMR is a by-product obtained during the processing of maize grain into flour mainly from small scale millers. It consists of the outer covering (coat) of the maize seed and few broken maize and relatively cheap and available in all communities in Nigeria. The amount of broken maize found in MMR is depended on the efficiency of the milling process and the variety of the maize. Generally, MMR is said to contain 89.41% Dry matter, 11.00% crude protein, 1.8% ether extract, 6.60% crude fibre, 68.07% nitrogen free extract, 62% Total digestible nutrient, 1.99% Ash, 0.30% Calcium and 0.16% phosphorus (Ogundipe, 2002).

MATERIALS AND METHODS

Experimental Site

The experiment was conducted at the Poultry section of Department of Animal Production Program, Teaching and Research farm, Abubakar Tafawa Balewa University Bauchi, Bauchi State, Nigeria. Bauchi town is located within Southern Guinea Savannah on latitude 13°13' N and longitude 11° 50' E at an altitude of 690.20m above sea level. It is characterized by two distinct seasons, the dry season from November to May and wet season from June to October. Ambient temperatures range from 15-19°C in December to January (cool season) and 33-44°C in March to June (hot season) and low relative humidity ranging from 5-43.5% (Alaku, 1983).

Experimental Materials

The ingredients for formulating the experimental diets include maize, maize milling residue, millet offal, Soya bean, fish meal, common salt, bone meal, methionine, lysine and mineral-vitamin premix. All ingredients were purchased in the local market within Bauchi and Yobe State. Experimental starter and finisher diets were formulated to meet protein and energy requirement of the birds

Experimental stock and management

Two hundred unsexed day-old Anak 2000 broiler chicks were used for the experiment. The chicks were placed on commercial starter diet during brooding for a week, before they were randomly assigned to experimental starter diets for four weeks. The experiment consisted of five treatments (diets) replicated four times with ten birds per replicate making it forty birds in a completely randomized design (CRD). Experimental diets and clean drinking water were provided *ad-libitum* during the conduct of the experiment. The experiment was concluded when the birds were five weeks on the diets. All management practices such as routine vaccination, proper sanitation and treatment of sick birds were strictly adhered to. Initial live weights of the chicks were measured at the beginning of the experiment; daily feed intake and weekly live weight gain during the conduct of the experiment were measured. At the end of the experiment, feed conversion ratio was evaluated.

3.4.2 Experimental diets

Five starter diets were formulated in which maize milling residue replaces millet offal at 0, 25, 50, 75, and 100% and designated as diets 1, 2, 3, 4, and 5 respectively. The compositions of the experimental diets and calculated analysis are presented in Tables 1.

Table 1: Composition (%) and calculated analysis of dietary levels of maize milling residue as replacement for millet offal fed to broiler starter chicks

Ingredients	Diets				
	1(0%)	2(25%)	3(50%)	4(75%)	5(100%)
Maize	45.17	45.17	45.17	45.17	45.17
Soya bean	35.33	35.33	35.33	35.33	35.33
Millet offal	10.00	7.50	5.00	2.50	0.00
MMR	0.00	2.50	5.00	7.50	10.00
Fish Meal	5.00	5.00	5.00	5.00	5.00
Bone Meal	2.50	2.50	2.50	2.50	2.50
Limestone	1.00	1.00	1.00	1.00	1.00
Salt	0.25	0.25	0.25	0.25	0.25
*Premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.20	0.20	0.20	0.20	0.20
Methionine	0.30	0.30	0.30	0.30	0.30
Total	100	100	100	100	100
Calculated Analysis					
CP(%)	23.41	23.30	23.21	23.10	23.00
ME (Kcal/kg)	3012.90	3009.20	3005.50	3001.80	2998.10
CF (%)	3.85	3.99	4.14	4.28	4.43
EE(%)	8.78	8.73	8.68	8.63	8.58
Ca (%)	1.68	1.67	1.67	1.67	1.66
P (%)	0.93	0.94	0.95	0.95	0.96
Lysine (%)	1.45	1.45	1.45	1.45	1.45
Methionine(%)	0.70	0.70	0.70	0.69	0.69

Results

Productive performance

The productive performance of broiler chicks fed dietary levels of maize milling residue (MMR) as replacement for millet offal is presented in Table 2. The initial live weights of the birds ranged from 215.75-231.550g and were similar. The daily feed intake (DFI) of broiler chicks ranged from 69.26-71.68g for broiler chicks on diets 1 and 4 respectively and the values did not differ significantly across the treatments. The daily weight gain (DWG) of broiler chicks ranged from 34.61-38.49g for chicks fed diets 5 and 1 respectively, however, all the values recorded were not significantly affected by dietary treatment. The final body weights of the birds varied between 949.80 and 1025.80g in broiler chickens on diets 5 and 1 respectively, and were not significantly affected by MMR levels. Feed conversion ratio varied between 1.82 and 2.04 in broiler chickens on diets 1 and 3. However, all values obtained were not significantly affected by levels of MMR in the diets.

Mortality

No mortality was recorded at the starter phase of the experiment.

Discussion

Productive performance

The results of the daily feed intake (DFI) were similar across the dietary treatment which ranges from 69.26-73.10g. Though not significant, higher value was obtained on diet 4 (75% MMR) and lower on diet 1 (0% MMR). High feed intake in diet 4 may result from fibrous nature of the test materials as MMR is more fibrous than millet offal. The values obtained were similar to the findings of Ezieshi and Olomu (2008) in broiler chickens fed palm kernel cake and millet offal. No significant dietary effect was observed in daily weight gain (DWG). Though not significantly different, the higher DWG was also recorded on diet 4. This cannot be attributed to dietary effect as the values did not follow a definite trend. The values are similar to findings of Ezieshi and Olomu (2004) in broiler chickens fed palm kernel cake and millet offal. The replacement of millet offal with maize milling residue has no

significant dietary effect among the treatments on feed conversion ratio (FCR). However, FCR was better in diet 1 (0% MMR). The values were also similar to those reported by Diara *et al.* (2002) in broiler chickens fed millet offal as replacement for wheat offal.

Table 2: Productive Performance of Broiler Starter Chickens Fed Dietary Level of Maize Milling Residues as Replacement for Millet Offal

Parameter	Diets					SEM
	1(0%)	2(25%)	3(50%)	4(75%)	5(100%)	
Initial Weight (g)	231.50	225.00	215.75	224.00	222.75	4.458 ^{NS}
Daily Feed Intake(g)	69.26	71.29	71.68	73.10	71.55	1.001 ^{NS}
Daily weight gain (g)	38.49	36.01	35.22	37.05	34.61	1.157 ^{NS}
Final live weight (g)	1025.80	985.00	967.80	1001.80	949.50	18.682 ^{NS}
Feed conversion ratio	1.818	1.98	2.040	1.97	2.073	0.059 ^{NS}
Mortality (number)	0	0	0	0	0	-

CONCLUSIONS

MMR can completely (100%) replace millet offal (MO) as dietary fibre for feeding broiler starter with no negative effects on performance.

Recommendations

Based on the results obtained, the following recommendations were made:

- Maize milling residue (MMR) is a suitable feedstuff and can be incorporated at 100% level in starter diets of broiler chickens as sole fibre source. It is a valuable substitute to most cereal fibres like millet offal particularly in the areas where it is cheap and readily available.
- Further research should be conducted to evaluate the suitability and its utilization in the diets of other monogastric animals such as layers, guinea fowl, turkey, ducks and rabbits.

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