HAEMATOLOGY AND ECONOMICS PRODUCTION OF BROILER CHICKENS FED DIETARY LEVELS OF MAIZE MILLING RESIDUE AS REPLACEMENT FOR MILLET OFFAL

***Yusuf S.Z.[1], Muhammad A. S.,[2] Yusuf H. B[1],Yahya M.M.[1]**

[1] Department of Animal Science and Range Management, Faculty of Agriculture, Modibbo Adama University, Yola, Nigeria

[2] Department of Animal Production, School of Agriculture and Agricultural Technology, Abubakar Tafawa University , Bauchi, Nigeria

Corresponding Author- Email dbanuzubair@gmail.com

Phone- 08036570663.

ABSTRACT

The experiments was conducted to determine the Haematology and Economics of production of broiler chickens 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). Experimental feed and water were offered *ad-libitum.* The feeding trials lasted for eight weeks. At the end of the experiment, blood samples were collected for haematology. The haematological indices which include packed cell volume, haemoglobin, red blood cells and white blood cells were not affected by the dietary treatment except mean corpuscular volume (MCV) and mean corpuscular haemoglobin (MCH). The highest values for MCV (141.55) and MCH (44.64) were both recorded on diet 3 (50% MMR). The results of cost of gain analysis indicated that feed cost in naira per kilogram of feed decreased slightly as maize milling residue substitute millet offal,. The lowest cost/kg gain (₦323.94) was on diet 2 (25% MMR) and the highest cost/kg gain (₦375.25) was in diet 3 (50% MMR). Based on this analysis it is economical to use MMR for broiler feeding than MO, it has also been concluded that MMR can completely (100%) replace millet offal (MO) as dietary fibre source for feeding broiler finishers with no negative effects on Haematology accompanied by slight reduction in cost of production.

Key words: Broilers Chickens, Millet offal, Maize milling residue, Haematology Economy of production.

INTRODUCTION

The most important economic factor in livestock production is the reduction in cost of production which may lead to sustainable production and higher returns. This important aspect has prompted animal nutritionist and farmer to pay attention to the use of nonconventional feed ingredients for production, as cost of feeds account for 70-85% of cost production in monogastrics (eg poultry) (Olusiyi *et. al.,* 2018). In achieving this mission, the health and nutritional requirements of the animals most not be compromised and economy of production should also be put into consideration.

One of the ways of assessing the nutritional quality of feed materials *(invivo*) is through analyzing the haematological parameters of the animals exposed to the said material.

One of the agro-industrial by-products that are cheap and available all year round throughout the tropical region which may be used in poultry diet is maize milling residue (MMR). *Invitro* studies(Proximate analysis) revealed that MMR 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). While millet offal is said to contained high crude protein content ranging between 10.51 and 21.86%.(Abasiki *et al*.(2015)..

MATERIALS AND METHODS

The study was conducted in the teaching and research farm of the Department of Animal Production Abubakar Tafawa Balewa University Bauchi. Two hundred unsexed Anak 2000 broiler chicks (day old) were used for the experiment. The chicks were randomly assigned to five treatments consisting of 40 birds

per treatment replicated four times with ten birds per replicate each, in a completely randomized design (CRD). One week adaptation period was observed during which commercial starter diet was fed to the birds. Experimental diets were gradually introduced and clean drinking water was provided *ad-libitum* during the conduct of the experiment. All management practices were strictly adhered to.

Experimental diets

Five (5) starter and finisher diets were formulated for the study, where maize milling residue replaces millet offal at 0, 25, 50, 75, and 100% and coded as T1,T2, T3, T4, and T5 respectively. The diets were formulated to meet the nutritional requirements of the birds. The compositions of the experimental diets and calculated analysis are presented in Tables 1 and 2.

Blood sample collection

Blood samples were collected from the wing veins of the birds using sterilized disposable 5ml syringe and 23 gauge needle at the end of the experiment using the normal procedure for haematological analysis. Schalm *et al.* (1975)

Economics of production

The costs of gain of the experimental diets were determined at the end of the study. The economic analysis was based on the market prices of the feed ingredients used during the study period. The cost per kg of each diet, total feed intake per bird and the cost per kilogram of weight gain by each bird were assessed. The price of each bird was determined. The control was compared with the other diets to ascertain the cost saved or otherwise.

RESULTS

Haematological indices

The Haematological indices of the experimental birds is presented in table 3. There were no significant differences (P> 0.05) in values for packed cell volume, haemoglobin, red blood cells, white blood cell and mean cuposcular haemoglobin concentration except for mean corpuscular volume (MCV) and mean corpuscular haemoglobin (MCH) which were significantly different (P<0.05). The highest values for MCV and MCH were both recorded on diet 3 (50% MMR).The values(133.75-141.55fl) and (40.23-44.64pg) respectively concur with the findings of Abasiki *et al*. (2015) in broiler chickens fed maize and millet offal at different dietary levels. All the haematological indices recorded were higher than those reported by Kareem *et al*. (2015) who fed three types of commercial feeds, but the values all fell within the normal range reported by Jain, (1986). The non-significant levels of most of the parameters analyzed shows the nutritional similarities of the test materials.

Table 1: Composition (%) and calculated analysis of Experimental starter diets (1-4 weeks) with maize milling residue replacing millet offal.

	Diets with levels of replacements				
Ingredients	T1 (0%)	T2 (25%)	T3 (50%)	T4 (75%)	T5 (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	3005.20	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

Table 2: Composition (%) and calculated analysis of Experimental finisher diets (4-8 weeks) with maize milling residue replacing millet offal.

	Diets with levels of replacements				
Ingredients	T1 (0%)	T2 (25%)	T3 (50%)	T4 (75%)	T5 (100%)
Maize	48.67	48.67	48.67	48.67	48.67
Soya bean	28.83	28.83	28.83	28.83	28.83
Millet offal	15.00	11.25	7.50	3.75	0.00
MMR	0.00	3.75	7.50	11.25	15.00
Fish Meal	3.00	3.00	3.00	3.00	3.00
Palm oil	1.00	1.00	1.00	1.00	1.00
Bone Meal	1.50	1.50	1.50	1.50	1.50
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(%)	21.62	20.46	20.31	20.15	20.00
ME (Kcal/kg)	3054.05	3048.50	3042.95	3037.40	3031.85
CF (%)	3.80	4.02	4.24	4.45	4.67
EE(%)	8.85	8.78	8.70	8.63	8.55
Ca (%)	1.21	1.20	1.20	1.19	1.19
P (%)	0.71	0.71	0.72	0.73	0.74
Lysine (%)	1.23	1.23	1.23	1.23	1.23
Methionine(%)	0.66	0.66	0.65	0.64	0.64

Table 3: Blood Parameter of Broiler Chickens Fed Dietary Levels of Maize Milling Residue as Replacement for Millet Offal

	Diets					
Parameters	**1(0%)**	**2(25%)**	**3(50%)**	**4(75%)**	**5(100%)**	**SEM**
Packed cell volume (%)	33.55	36.08	33.35	27.95	30.08	2.23^{NS}
Haemoglobin (g/dl)	10.40	11.25	10.68	8.63	9.10	0.75^{NS}
Packed cell volume (%)	33.55	36.08	33.35	27.95	30.08	2.23^{NS}
MCV (fl)	136.18^{b}	134.30^{b}	141.55^{a}	135.82^{b}	133.75^{b}	1.490*
MCH (pg)	42.40^{ab}	41.90^{b}	44.638^{a}	41.93^{b}	40.23^{b}	0.827*
MCHC (g/dl)	31.00	31.20	31.53	30.88	30.08	0.419^{NS}

WBC (x 10^3 /µl)	261.27	265.20	253.18	237.07	243.17	11.174 NS

Economics of production

The values for the economy of production are presented in table 4. The parameters measured were total feed intake per bird, feed cost per kg, cost of feed eaten, total weight gained per bird, cost per kg gained and cost saved in relation to control diet. The results indicated that feed cost in naira per kilogram of feed decreased slightly as maize milling residue substitute millet offal and this is due to the slight variation in prices of the materials. The cost in naira per kilogram body weight gain did not follow a definite trend. The lowest cost/kg gain (₦323.94) was on diet 2 (25% MMR) and the highest cost/kg gain (₦375.25) was in diet 3 (50% MMR). Therefore the highest cost saving(₦ 20.97) was in diet 2. Based on this analysis it is economical to use MMR for broiler feeding than MO, this is because MMR is more readily available a bit cheaper than MO.

CONCLUSIONS

Based on the result obtain in this experiment, it has been concluded that MMR can completely (100%) replace millet offal (MO) as dietary fibre source for feeding broiler chickens with no negative effects on Haematology accompanied with slight decrease in feed cost per body weight gain.

RECOMMENDATION

Based on the results obtained, the following recommendation was made:

Maize milling residue (MMR) is a suitable feedstuff and can be incorporated at 100% level in both broiler starter and finisher diets 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.

Table 4: Economics of production of feeding Broiler Chickens with varying Levels of Maize Millings Residues as Replacement for Millet Offal

Parameter	Diets				
	1(0%)	2(25%)	3(50%)	4(75%)	5(100%)
Total feed intake (kg)	5.80	5.71	5.82	5.75	5.66
Feed cost (N/kg)	150.45	150.34	150.23	150.43	150.02
Total feed cost (N)	872.16	858.44	874.34	864.25	849.11
Total weight gain (Kg)	2.53	2.65	2.33	2.40	2.50
Cost/ Kg gain (N/kg)	344.91	323.94	375.25	360.41	339.61
Cost savings (N/kg)	0.00	20.97	- 30.34	- 15.50	5.30

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