UTILIZATION OF MAIZE OFFALS AS A REPLACEMENTTO WHEAT OFFALS AS DIETARY FIBRE SOURCES BY BROILER CHICKENS AT STARTER PHASE

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ABSTRACT
An experiments was conducted to evaluate the response of broiler chickens to dietary levels of maize offal as replacement to wheat offal. Using a completely randomized design, three hundred broiler chicks were used in the trial. Feed and water were supplied *ad lib* and the trial lasted for 4 weeks. In the experiments maize offal replaces wheat offal as diet 1,2,3,4 and 5 respectively, as 0 (diet 1), 25 (diet 2), 50 (diet 3), 75 (diet 4), and (diet 5)100% levels. The Results showed no significant influence ($P<0.05$) of diet on initial weight, total weight, final weight gain and feed conversion ratio. However, performance traits significantly ($P<0.05$) differ among the diets on total feed intake, daily feed intake, daily weight gain and week 4 weight gain respectively. It was therefore concluded that maize offal can replace wheat offal in broiler chicken diets without compromising performance.
Keywords: Commercial diets, Broiler chickens and performance.

INTRODUCTION.

Poultry" can be defined as domestic fowls, including chickens, turkeys, geese and ducks raised for the production of meat or eggs and the word is also used for the flesh of these birds used as food. Poultry also include other birds that are killed for their meat, such as the young of pigeons (known as squabs) but does not include similar wild birds hunted for sport or food and known as game. Poultry can be distinguished from "game" defined as wild birds or mammal hunted for food or sport, a word also used to describe the flesh of these when eaten. Nowadays poultry production has developed and occupies a place of pride among the livestock enterprises due to its rapid monetary turnover (Kheravvi et al., 2018). This has made the enterprise attractive and popular among small, medium as well as large scale poultry farmers (Kheravvi et al., 2018). Fibre refer to fibre as cell walls of plant tissue that mostly consist of lignin, cellulose as well as hemicelluloses. (Mc Donald et al.,1994) The poultry industry has become a diverse industry with a variety of business interests such as egg production, broiler production, hatchery and poultry equipment business (Oluyemi and Roberts, 1999). Fibre is thought to decline chicken production and growth that is it decreases the effectiveness of feed utilization (Vantsawa, 2001). Maize is a stable food for millions of people in sub-Saharan Africa. Although white maize is more popular in most households, few know that yellow maize is more nutritious than white maize. maize is an excellent and most popular source of energy used in broiler diets (Aduku., 1993). Therefore, sorghum, millet, maize offal, rice bran and wheat offal, millet bran, spent sorghum grain and broken rice could be recommended as alternative sources of feed ingredients in poultry diets.(Medugu *et al*.,2011). Several workers have emphasized the need for utilizing alternative feed ingredients removed from human and industrial uses (Durunna et al., 1999; Fanimo *et al*., 2007; and Nsa *et al*., 2007).

MATERIALS AND METHOD

The experiments were carried out at the Poultry Unit, Teaching and Research Farm, Abubakar Tafawa Balewa University, Bauchi. The town, Bauchi, is located within the southern guinea savannah on latitude 10.31 N and longitude 9.84 E. It is 616 metres above sea level characterized a rainy season that commences in May and terminates in October and a dry season that starts in November and ends in April. Mean annual rainfall is 1009 mm, highest relative humidity 94% (August) and the lowest 35% (February). Temperatures are between 13-17oC (December – February) and 36 – 37oC (March – April) (World Atlas, 2015).

Experimental Diets

Experimental starter diets containing 23% CP. Diet 1 which served as the control contained 0% maize offal, while diets 2, 3, 4 and 5 contained 25, 50, 75 and 100% levels of maize offal as replacement for

wheat offal. The ingredients were measured out and mixed using a feed mill mixer to ensure homogeneity. Percentage composition of graded levels of maize offal for wheat offal in broiler starter are presented in Tables 1. A total of three hundred (300) day-old Cobb 500 broiler chicks obtained from a commercial hatchery were used for the experiment. Prior to the commencement of the experiment, the study pens were cleaned washed, disinfected and fumigated. Similar treatment was also made on the feeders, drinkers and other equipment. A week after, wood shavings were spread on the floor of the experimental pens to a depth of approximately 3 inches. Adequate heating/lighting facilities, feeders, and drinkers were also provided.

After brooding the chicks for 2 weeks, where all recommended vaccinations were also made. Feed and clean drinking water were served ad libitum throughout the 56-day trial period. Birds were also given the second dose of Infectious Bursal Disease vaccine (Gumboro vaccine) (Booster) on the 21st day and another of NCDV a week after.

Table 1: Ingredients Composition (%) and Calculated Analysis of Dietary Levels of Maize Offal as Replacement for Wheat Offal Fed to Starter Broilers (1 – 4 weeks)

	Diets				
Ingredient	**1**	**2**	**3**	**4**	**5**
Maize	46.50	46.50	46.50	46.50	46.50
Full-fat soya bean	34.00	34.00	34.00	34.00	34.00
Wheat offal	10.00	7.50	5.00	2.50	0.00
Maize offal	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 (NaCl)	0.25	0.25	0.25	0.25	0.25
Premix* (Starter)	0.25	0.25	0.25	0.25	0.25
Methionine	0.30	0.30	0.30	0.30	0.30
Lysine	0.20	0.20	0.20	0.20	0.20
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Calculated analysis (%)					
ME (Kcal/kg)	2835.00	2847.68	2859.00	2872.14	2881.52
Crude Protein	22.85	22.75	22.65	22.55	22.45
Crude Fibre	3.70	3.78	3.87	3.96	4.05
Ether Extract	4.01	4.00	3.98	3.96	3.95
Calcium	1.80	1.79	1.79	1.79	1.79
Phosphorous	0.82	0.82	0.81	0.81	0.81
Methionine	0.66	0.66	0.66	0.66	0.66
Lysine	1.20	1.20	1.20	1.20	1.20

ME; Metabolizable energy.

Experimental Design

The birds were weighed to determine their initial weights and randomly allotted to five experimental diets in 3 replicates of 20 birds each in a completely randomized design (CRD).

The experiment were conducted in a completely randomized design (CRD), (Steel and Torrie, 1990).

Data Collection

Feed consumption, weight gain, feed conversion ratio, and mortality were the performance parameters monitored during the study period. Initial live weights of chickens were taken at the beginning of each experiment, thereafter, weekly weights were determined. These were in turn used to calculate the daily weight gain (DWG). Daily mean feed intakes were also determined by subtracting the weight of left-over feed from the quantity offered the previous day. Feed conversion ratio on the other hand, was calculated from the relationship;

$FCR = FI/WG$ ……. *(3)*

Where FCR= feed conversion ratio, FI= feed intake and WG= weight gain. Mortalities were recorded for each treatment throughout the feeding trial.

RESULTS AND DISCUSSION.

The performance of broiler chickens fed dietary levels of maize offal as replacement for wheat offal is presented in Table 2.

Initial weights of birds used in this experiment which ranged between 207.66 (diet 3) to 226.66 g (diet 5), was not significantly different among diets. This agrees with Makinde and Sonaiya (2011). These authors however, did not report any significant difference in initial weight and daily weight gain in starter phase. However, body weight at 4 weeks was significantly (P<0.05) affected with birds on diet 5 (997.38 g) having higher weights while those fed diet 1 (888.43 g) had the lowest, The significant influence of diet on body weight gain obtained at the starter phase contradicts to the findings of Ajighjigh *et al.* (2017) and Ajighjigh *et al.* (2018) whose found no significance different on body weight gain at starter phase (671.34) and (678.46) for birds on diet 3 and 4 respectively, but concur with Makinde and Inuwa (2015) whose reported significance influence on body weight at starter phase. Diet 3 (852.35g) was intermediate and did differ from diets 2 (941.20 g) and 4 (903.17 g). Mortality of two birds was recorded on diets 2 and 3 during the starter phase.

Table 2: Performance of Broiler Chickens Fed Diets Containing Maize Offal as replacement for Wheat Offal

	Diets					
Parameters	**1**	**2**	**3**	**4**	**5**	**SEM**
Productive performance						
Initial weight (g)	211.33	220.00	207.66	215.00	226.66	10.91^{NS}
Week 4 weight (g)	888.43^{c}	941.20^{ab}	852.35^{b}	903.17^{ab}	997.38^{a}	45.34*
Total weight gain (g)	1099.76	1161.20	1060.01	1118.17	1224.04	102.73^{NS}
Starter phase (1 – 4 weeks)						
Total feed intake (g)	1199.52^{b}	1748.60^{a}	1695.40^{a}	1792.56^{a}	1994.16^{a}	176.45*
Daily feed intake (g)	42.84^{b}	62.45^{a}	60.55^{a}	64.02^{a}	71.22^{a}	5.83*
Daily weight gain (g)	15.97^{c}	25.76^{ab}	23.02^{b}	24.58^{ab}	27.52^{a}	2.30*
Feed conversion ratio	2.69	2.43	2.65	2.61	2.59	0.24^{NS}
Mortality (No.)	0	1	1	0	0	-

^{abc}Means bearing different superscripts within the same row differ; * = (P<0.05); NS= Not significant; SEM = Standard Error of Means

CONCLUSION AND RECOMMENDATION

Based on the results obtained in this study, it was concluded and recommended that; Maize offal can replace wheat offal in broiler starter chicken diets without compromising performance. There for maize offal can be recommended as a potential fibre source in broiler starter chicken diets.

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