

EGG QUALITY CHARACTERISTICS OF LAYERS FED GRADED LEVELS OF KAURA SORGHUM (*SORGHUM BICOLOR*) REPLACING MAIZE WITH FULL-FAT SOYA BEAN

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ABSTRACT

An experiment was conducted to evaluate the egg quality characteristics of layer chickens fed dietary levels of kaura sorghum. Five diets (16% CP) were formulated, in which the Kaura Sorghum was included at 0, 25, 50, 75 and 100% levels and the diets designated as treatments T1, T2, T3, T4 and T5 respectively. Kaura sorghum was used to replace maize as a dietary energy source. Three hundred brown pullets were used for the research. They were allotted to the five treatments which were replicated four times each with twenty birds per replicate in a completely randomized design (CRD). Three eggs were collected from each replicate on weekly basis to determine both the internal and external egg quality parameters. It was revealed that egg quality parameters were significantly ($P < 0.001$) affected except egg weight and shell weight that were affected ($P < 0.01$ and $P < 0.05$ respectively). However, yolk weight, albumen height and shell thickness were not affected. It was concluded that, kaura sorghum can completely replace maize as dietary energy source in layer chickens with full fat soya bean as protein source with no adverse effect on egg quality characteristics as well as reduction in feed cost.

Key words: Pullet, Shell, Yolk, Albumen,

INTRODUCTION

Maize serves as the major staple food stuff for a good proportion of Nigerians. Thus its ever increasing demand for human consumption, livestock feed and industrial uses have raised its market value. Maize is also the best and conventional source of energy in livestock ration and energy constitute about 60% of these rations. Cost of the conventional maize will definitely increase the cost of animal feeds and will consequently increase the cost of production. The primary aim of producing quality meat and eggs at minimal cost by poultry farmers have been affected due to man's keen competition with his animal over the grain maize (Ademosun and Eshiett, 1980; Ijaiya *et al.*, 2002). This has been the major obstacle in developing the poultry industry in Nigeria. Over the decades, alternative feed stuff has been developed to replace the expensive conventional ones. One of such alternatives is sorghum that has proximate composition very close to that of maize. Sorghum is very easy to cultivate, tolerant to drought and can be grown on poor soil condition where maize cannot do well, lower cost of production, stable and lower market price and year round availability makes it more preferable to maize. In Nigeria, the role of the poultry industry is very important because of its essential contributions in human nutrition.

MATERIALS AND METHODS

The experiment was conducted between February 2015 and October 2016. Five dietary treatments were formulated with kaura sorghum as a replacement for maize using full-fat

soyabean as a protein source. Kaura sorghum replaced maize at 0, 25, 50, 75 and 100% in diets 1, 2, 3, 4 and 5 respectively. The full-fat soyabean was mixed with milled kaura sorghum variety and other ingredients to formulate diet with 16% CP. Three hundred (300) brown pullets were used for the research. The birds were allotted to the five dietary treatments which were replicated four times with fifteen (15) birds per replicate in a completely randomized design (CRD). On weekly basis a total of twelve (12) eggs (3/replicate) were collected from each of the five treatments to determine the internal and external egg parameters. This activity was done for eight weeks. The egg quality parameters measured were egg weight, egg length, egg width, yolk length, yolk height, yolk weight, albumen length, albumen height, albumen weight, shell weight and shell thickness. Vanier caliper and micrometer screw gauge were the instruments used in taking the readings. The percent compositions of the various feed ingredients used in formulating the five dietary treatments is presented in Table 1.

RESULTS AND DISCUSSION

Most of the egg quality parameters studied in this research were significantly ($P < 0.001$) affected by the dietary treatments except in shell weight ($P < 0.01$) and Non-significance in yolk weight, albumen height and shell thickness. These findings are in consonance with the report of Murakami *et al.* (1993), who revealed that egg weight depended largely on daily protein intake. Bangbose and Biobaku (2003) reported similar findings in laying hens. Also, Oruwari (2003) stated that with proper protein balance kaura sorghum could completely replace maize in the diets of layers and broiler chickens.

CONCLUSION

It was concluded that, kaura sorghum can completely replace maize as dietary energy source in layer chickens feed with the full fat soya bean as protein source with no adverse effect on egg quality characteristics as well as reduction in feed cost.

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Table 1: Ingredients and Percentage Composition of Layer Diets Containing Graded Levels of Kaura Sorghum with Full-Fat Soya Bean as Protein Source

Ingredients	Diets				
	1 (0%)	2 (25%)	3 (50%)	4 (75%)	5 (100%)
Maize	50.00	37.5	25.00	12.50	00.00
Kaura Sorghum	00.00	12.50	25.00	37.50	50.00
Soya bean	16.70	16.70	16.70	16.70	16.70
Wheat offal	20.00	20.00	20.00	20.00	20.00
Fish meal	2.00	2.00	2.00	2.00	2.00
Limestone	7.0	7.0	7.0	7.0	7.0
Bone meal	3.0	3.0	3.0	3.0	3.0
Premix	0.20	0.20	0.20	0.20	0.20
Salt	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					
Crude protein (%)	16.55	16.81	17.05	17.31	17.55
M.E (Kcal/kg)	2551.20	2534.84	2518.34	2501.84	2485.34
Crude fibre (%)	3.66	3.64	3.64	3.64	3.64
Ether extract (%)	3.37	2.87	3.12	1.87	2.87
Calcium (%)	3.71	3.78	3.80	3.89	4.19
Phosphorus (%)	0.60	0.65	0.69	0.72	0.80
Methionine (%)	0.37	0.40	0.42	0.44	0.46
Lysine (%)	0.84	0.84	0.85	0.87	0.89

Vitamin-mineral Premix contains the following per 2.5 kg: Vitamin A 10,000 IU, Vit. D3 2,000,000IU, Vit E 12,000mg, Vit K3 2,000mg, Vit B1 1,500mg, Vit B2 4,000mg, Vit B6 1,500mg, Niacin 15,000mg, Vit B12 10mcg, Pantothenic acid 5,000mg, Folic acid 500mg, Biotin 20mcg, Cholinechloride 100,000mg, Manganese 75,000mg, Zinc 50,000mg, Iron 20,000mg, Copper 5,000mg, Iodine 1,000mg, Selenium 200mg, Cobalt 5000mg, Antioxidant 125,000mg.

Table 2: Egg Quality Characteristics of Layers Fed Dietary Levels of Kaura Sorghum Replacing Maize with Full-Fat Soya Bean

Parameters	Diets					SEM
	1 (0%)	2 (25%)	3 (50%)	4 (75%)	5 (100%)	
Egg weight (g)	54.00 ^{ab}	52.51 ^b	53.30 ^{ab}	54.14 ^{ab}	54.96 ^a	0.47**
Egg length (cm)	9.64 ^a	9.57 ^a	5.49 ^b	5.51 ^b	5.54 ^b	0.62***
Egg width (cm)	7.72 ^a	7.40 ^a	4.19 ^b	4.24 ^b	4.24 ^b	0.71***
Yolk weight (g)	16.29	15.60	15.26	15.49	15.86	0.02 ^{NS}
Albumin length (cm)	14.40 ^a	14.05 ^a	7.60 ^b	8.07 ^b	7.71 ^b	0.59***
Albumin height (cm)	0.68	0.67	0.65	0.65	0.70	0.06 ^{NS}
Yolk height (cm)	1.52 ^b	1.48 ^b	1.61 ^b	1.38 ^b	5.14 ^a	0.72***
Yolk length (cm)	7.45 ^a	7.47 ^a	4.15 ^b	4.15 ^b	4.20 ^b	0.58***
Shell weight (g)	6.49 ^b	6.43 ^b	6.65 ^{ab}	6.65 ^{ab}	6.75 ^a	0.26*
Shell thickness (mm)	0.46	0.48	0.50	0.48	0.46	0.01 ^{NS}

^{ab} = Means bearing same superscripts within the same rows are statistically similar (* = $p < 0.005$,

** = $p < 0.01$, and ***= $p < 0.001$), SEM = Standard Error of Mean and NS = Not Significant