EFFECT OF GARRI SIEVATE ON EGG PRODUCTION OF ISA BROWN HENS

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Abstract
A total of 80, sixteen weeks old pullets were used in a study to investigate the effect of feeding garri sievate on the performance of Isa brown hens. Garri sievate was obtained from garri processing factory and mixed other ingredients to formulate a layers diet. Five dietary treatments were compared comprising of 0%, 10%, 20%, 30% and 40% inclusion of garri sievate. Performance and egg production was monitored over 10 weeks and data collected were subjected to analysis of variance suitable for completely randomized design.
Inclusion of garri sievate had no significant ($p>0.05$) effect on final body weight, average weight gain, age at sexual maturity, and body weight at sexual maturity. However, average daily intake, egg weight and feed cost per dozen egg were significantly ($p<0.05$) influenced by garri sievate. Feed intake increased ($p<0.05$) with inclusion of garri sievate and ranged between 81.13 and 85.66g/bird/day. Birds came into lay between 182.17 and 190days and body weight at sexual maturity ranged between 1521.43 and 1558.33g. The cost of producing dozen eggs was significantly ($p<0.05$) improved from N513 to N300 by inclusion of garri sievate up to 30%. It is therefore recommended that garri sievate be included in layers diet up to 20% as it supports egg production and cost of feed production is reduced.
Key words: *Isa brown hen, garri sievate, egg weight, hen day production.*

Introduction

Poultry production as an aspect of livestock production is important to the biological needs, economic and social development of the people in any nation (Oladeebo and Ambe-Lamidi, 2007). The production and supply of meat and eggs to meet the people's dietary demand for animal protein is of great concern (Olubamiwa *et al.*, 2002). A major limitation to poultry production is high cost of feed brought about by stiff competition between industries and livestock and fluctuations in the price of ingredients. This has necessitated research into the use of alternative ingredients.

Garri sieviate is one of the agro-industrial by-products that are readily available in countries where cassava is cultivated and processed into food for man. It contains about 3.73% Crude Protein, 4.05% Crude Fibre and 2890.61kcal/kg Metabolizable Energy. Many processing methods have been used to enhance the feeding value of cassava, they include Sun-drying (Akinfala *et al*., 2007), Parboiling (Salami, 1999), Soaking in water and retting (Salami and Odunsi, 2003). Cassava grit is a well processed, dried cassava meal which stands readily as an alternative feeds (Eruvbetine *et al.*, 2000). This research study is therefore designed to investigate and evaluate the potential of the Garri sieviate as an energy source feed ingredient fed at different levels to layers.

Materials and Methods

The experiment was conducted at the Poultry Unit of University of Ilorin Teaching and Research Farm, Ilorin, Kwara State, Nigeria. The University is located in the southern Guinea savannah ecological zone of Nigeria (longitude 170.29°N and latitude 40.35°*E*).

Experimental Birds, Materials and Housing

A total of eighty (80) Isa-brown hens were purchased at point of lay (16 weeks) from a reputable farm in Offa, Kwara State. Vitamix® Powder was administered according to the manufacturer instruction on arrival to reduce transportation stress. The birds were randomly allocated into five (5) treatments consisting of the control diet (0% garri sievate), and 10%, 20%, 30% and 40% inclusion of garri sievate. The birds were raised in cages with two birds in a unit, each treatment consisting of sixteen hens.

Dried garri sievate was obtained from the Model Cassava Processing and Demonstration Centre, Sabo-oke Community, Ilorin South LGA, Kwara State. Other feed ingredients were obtained from reputable feedmill and the experimental diets were formulated to meet the NRC requirement for laying birds (Table 1).
Feed and water were supplied *ad-libitum* throughout the 16 weeks experimental period in accordance with institutional guidelines and care of animal research and experimentation. The birds were vaccinated against Newcastle disease every four weeks during the egg laying period (sexual maturity). The experimental birds were subjected to the same management practices and treatment throughout the period of the experiment.

Data Collection and Analysis

Body Weight (BW): The birds were weighed weekly using a sensitive scale and recorded.

Weekly weight gain =Final weight (g) - Initial weight (g)

Feed Intake (FI): Feed intake for each week was obtained by subtracting the left-over of feed at the end of the week from the initial feed weighed in the polythene bag for each diet at the beginning of each week.

Weekly feed intake = Total amount of initial feed (g) - weighed left-over (g)

Body Weight at Sexual Maturity: This is the body weight of the bird taken when it starts to lay.

Age at Sexual Maturity: This is the age at which each hen begins to lay and it was recorded.

Daily collections of eggs were done and the eggs were weighed to determine the egg weight

- Egg Weight (EW): The egg weight was determined using an electronic top loading scale and the determined weight was recorded on a daily basis for nine (9) weeks after the birds has reach sexual maturity.
- Feed cost/dozen eggs: This was obtained using the formula;

  $$\frac{\text{Total grams of feed consumed}}{\text{Total number of eggs produced}} \times 12$$

- Hen-Day Production (HDP): This is a measure of the egg productivity of live birds per day. It expresses the number of eggs produced as a percentage of number of hen-days.

  $$\frac{\text{Number of eggs produced}}{\text{Number of Hens} \times \text{number of days}} \times \mathbf{100}$$

Statistical Analysis

Data obtained were subjected to analysis of variance (ANOVA) in a completely randomized design (CRD) using Statistical Analysis System (SAS, 2015) package. Significant mean differences were separated using Duncan multiple range test.

RESULTS AND DISCUSSION

Table 2 shows the performance indices of laying birds fed graded levels of garri sievate. Final body weight and average weight gain was not significantly ($p>0.05$) influenced by garri sievate. Similar final body weight and average weight gain recorded for the birds on different treatments implied that garri sievate could actually replace maize without adverse effect on the body weight and weight gain of the hens. At these levels of inclusion, garri sievate supplied energy that was comparable to that of control diet and thus met the birds' requirement when fed *ad-libitum*. Rafiu et al., (2015) had reported a significant difference in weight gain of broilers fed garri sievate.
Birds on the control group and those fed 10% garri sievate had similar ($p>0.05$) feed intake, increased dietary levels of garri sievate increased ($p<0.05$) feed intake. Feed intake was significantly influenced by the dietary levels of garri sievate and ranged between 81.13-85.66g/bird which is lower than 115g/bird reported for layers by Petek (1999). Feed intake can be influenced by the energy content of the diet, strain of the bird, ambient temperature and rearing environment (Muthusamy and Viswanathan, 1998). The metabolizable energy decreased as the garri sievate increased in the feed and the lower the energy content, the higher the intake (Uchegbu and Udedibie, 1998; Ugwuene *et al*., 2005) as poultry feed to satisfy their energy requirement.

Dietary levels of garri sievate had no significant effect (p>0.05) on age and body weight at sexual maturity, but birds fed 20% garri sievate came into lay earlier than others (182.17days). It has been reported that egg-type chickens must reach a minimum age and body weight before commencing egg production and birds with low body weight commence lay later and lay fewer eggs. (Leesons and Summers, 1987); Oke et al., 2004; Lacin et al., 2008)

Hen day production was not influenced (p>0.05) by dietary garri sievate and ranged between 76.57 and 80.35%. This indicates that garri sievate provides the required nutrients for egg production. Aderemi *et al*., (2006) reported a decline in hen day production with inclusion of cassava in layers diet. Egg weight was significantly influenced by dietary inclusion of garri sievate with birds fed 10% garri sievate had significantly bigger (p<0.05) eggs than the other groups. Egg weight is influenced by body weight of the hen (Meky, 2007)

Inclusion of garri sievate in the layers reduced (p<0.05) cost of feed per dozen egg up to 30% inclusion level. Inclusion of 20% garri sievate resulted in the most efficient savings on cost of feed production.

Conclusions and recommendation

The results of the study showed that garri sievate can be used in formulating layers diet without compromising egg production. Feed cost per dozen eggs is best at 20% inclusion.

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Table 1: Composition of Experimental Diet

DIET	**1**	**2**	**3**	**4**	**5**
Level of inclusion	**0%**	**10%**	**20%**	**30%**	**40%**
Maize	58	50.7	43.4	36.1	28.8
Garri sievate	0	7.3	14.6	21.9	29.2
Soybean meal	10.0	10.0	10.0	10.0	10.0
Groundnut cake	11.0	11.0	11.0	11.0	11.0
Wheat offal	10.0	10.0	10.0	10.0	10.0
Fish meal	2.0	2.0	2.0	2.0	2.0
Bone meal	2.0	2.0	2.0	2.0	2.0
Oyster shell	4.15	4.15	4.15	4.15	4.15
Salt	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Methionine	0.20	0.20	0.20	0.20	0.20
Lysine	0.15	0.15	0.15	0.15	0.15
Palm oil	2.0	2.0	2.0	2.0	2.0
Total	**100**	**100**	**100**	**100**	**100**
Analysed CP (%)	18.29	18.03	17.79	17.57	17.38
Calculated Metabolizable: Energy (kcal/kg)	2829.0	2785.2	2738.4	2697.6	2653.8

Feeds

Table 2: Effect of Treatment on Performance Indices and Egg Production Traits

Traits	IBW (g/b)	FBW (g/b)	AWG (g/b/day)	ADFI (g/b)	TFI (g/b)	ASM (days)	BWSM (g)	EW (g)	HDP (%)	FC/DE (#/kg)
0%	890.62^{ab}	1590.00	43.33	81.75^{a}	9156.25^{a}	191.92	1558.33	54.83^{a}	79.59	513.00^{a}
10%	909.38^{b}	1612.50	43.94	81.13^{a}	9086.25^{a}	189.69	1521.43	57.10^{b}	80.35	374.00^{b}
20%	896.88^{ab}	1566.70	41.46	83.64^{ab}	9366.86^{ab}	182.17	1554.17	54.77^{a}	78.46	300.00^{c}
30%	881.25^{ab}	1573.30	42.71	85.66^{b}	9593.13^{b}	185.14	1535.71	53.81^{a}	76.78	348.00^{bc}
40%	820.00^{a}	1575.00	47.23	84.56^{ab}	9470.00^{ab}	189.90	1538.89	54.84^{a}	76.57	505.00^{a}
SEM	103.59	140.26	8.44	3.49	382.88	48.73	149.40	3.83	22.09	36.50
	NS	NS	NS	S	S	NS	NS	S	NS	NS

Means with different superscripts within the same column are significantly different (P>0.05). IBW: Initial Body Weight, FBW: Final Body Weight, WG: Weight Gain, ADFI: Average Daily Feed Intake, TFI: Total Feed Intake, ASM: Age at Sexual Maturity, BWSM: Body Weight at Sexual Maturity, EW: Egg Weight, HDP: Hen-day Production, and FC/DE: Feed cost/dozen eggs, g/b: gram/bird, g/b/wk: gram/bird/week.
S-Significant
NS-Not significant
SEM-Standard Error of Mean