



Effect of Limestone as Free Choice in the Performance of Laying Pullets

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ABSTRACT

A total of 96 birds were used in the experiment. Treatment 1 were fed with standard layer diet containing 2650kcal/kg of metabolizable energy. While birds for treatment 2 were fed the same diet and limestone as free-choice. Records were taken on feed intake, water intake, egg production, egg weight and mortality. Feed conversion was obtained from kilogram of feed and kilogram of egg produced. The statistical analysis shows that, there were no significant ($p>0.05$) difference between the two groups in terms of records taken. Although not significant, birds fed limestone as free choice performed better than the other group (1). Limestone fed as free choice for group 2, significantly increase the cost of production. Treatment 2 generate better revenue from the sales of eggs. Base on the difference obtained from this study, limestone fed as free choice improved the performance of the birds. It could be concluded that limestone has no detrimental effect on the birds and improve their performance

Keywords:

birds, limestone, metabolizable energy

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1. Introduction

Poultry is considered to be a means of livelihood and a way of achieving a certain level of economic independence in Nigeria. In fact, poultry production is unique in that, it offers the highest turnover rate and the quickest return to investment in the livestock enterprises. The cost of livestock feed and feed ingredient in recent years have increase enormously, accounting for over 70% of the intensive non-ruminant production in the third world countries including Nigeria [3].

Limestone is an important source of calcium in poultry diet. It availability and cost is fair in most northern parts of Nigeria. Egg constitute 40% of calcium, 98% of which is calcium carbonate (CaCO_3) [5]. Thus this study is to reveal the benefits of using limestone as free-choice in the diet of laying pullets.

Objectives of the study

1. To evaluate the effects of feeding limestone as a free-choice on the performance characteristics of laying pullets.
2. To determine cost benefit of feeding limestone as free-choice.

2. Materials and Methods

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2.1 Study Area

The study was conducted at Sokoto veterinary center along Aliyu Jodi Road, Sokoto. According to Reuben [7], Sokoto is on latitude 12° to 14° and longitude 5° to 6°E in the Northern part of Sudan savannah belt. Mean annual temperature is 34.9°C with the highest in April ranging from 38°C to 41°C and lowest in January ranging from 13 to 16°C [7]. Total annual rainfall is about 707 to 750mm and very intense which lasts for three months, from mid June to September.

2.2 Experimental Birds and Design

A total of 96 Black-Haco birds were divided into 6 groups of 16 birds each. Three groups were assigned to each one of the two treatments (treatment 1 and 2) as replicates. The treatments were diet 1 with a standard layer diet (table 1) and treatment 2 is the same with treatment 1 except introduction of separate feeder for limestone as free-choice. The birds were housed in an open sided house covering an area of 3m x 1.5m. Wood shaving was used as litter material. The birds were provided with 6 circular feeders made of galvanized steel and 6 plastic bowl drinkers for feed and water respectively.

Table 1

Gross composition of layers diet

| Ingredient | Proportion % |
|----------------|--------------|
| Maize | 40.00 |
| Wheat offal | 29.00 |
| Groundnut cake | 13.50 |
| Fish meal | 2.00 |
| Blood meal | 2.30 |
| Bone meal | 6.45 |
| Limestone | 5.35 |
| Methionine | 0.20 |
| Lysine | 0.20 |
| Premix | 0.25 |
| Salt | 0.30 |
| Total | 100 |

Table 2

calculated nutrient contents

| | |
|-------------------|---------|
| Energy (kcal/kg) | 2400.00 |
| Crude protein (%) | 17.00 |
| Crude fiber (%) | 6.50 |
| Ether extract (%) | 3.70 |
| Methionine (%) | 0.35 |
| Lysine (%) | 0.70 |
| Calcium (%) | 3.50 |
| Phosphorus (%) | 0.45 |

2.3 Health Management

During the study, the birds were given medication as recommended for laying pullets. Thus all necessary precautions were put in place to safeguard the life of the laying pullets.

Multivitamins/antibiotics and coccidiostat (Pantacox) were given via drinking water to prevent disease outbreak and to improve health and production of the birds.

2.4 Data collection

Data were collected for feed intake, water intake, limestone intake and egg production on daily basis. Egg weight on weekly basis and mortality was recorded as it occurred. Feed conversion was calculated from the record of feed consumed and dozen of eggs produced.

2.5 Data analysis

All data collected during the experiment were subjected to analysis of variance.

3. Results and Discussion

The average feed intake per bird/day did not differ significantly ($p > 0.05$) between the treatments. Even though, birds fed limestone as free choice consumed more feed than the control treatment. The values are 101.05 and 105.98g for treatment 1 and 2 respectively. Adamu and ubosi [2] reported lower values of 92.78 to 98.53g/b/d.

Average water intake also shows no significant difference ($p > 0.05$) between the treatments. Egg production shows significant ($p < 0.05$) difference between the treatment. Farrell *et al.*, [3] reported higher values of 57 to 62% egg production.

Average egg weight of treatment 2 was higher than that of treatment 1. This could be as a result of limestone given as free choice. Onifade *et al.*, [6] reported higher value of average egg weight 55-56.43g when they fed diet containing different levels of maize offal and cassava meal to layers. Feed conversion show significant ($p < 0.05$) difference between the treatment with treatment 2 having the higher value of 5.01 and 4.43 for treatment 1. Farrell *et al.*, [3] reported lower value of 3.15 for kg of feed consumed/kg of egg produced.

Table 3

Performance characteristics of the laying pullets

| Parameters | Treatment | |
|----------------------------|----------------------|--------------------------------------|
| | 1 feed only | 2 feed + limestone as free choice |
| Feed intake (g/b/day) | 101.05 ^{ab} | 101.98 ^a |
| Water intake (l/b/day) | 0.32 ^{ab} | 0.34 ^a |
| Limestone intake (g/b/day) | - | 18.53 |
| Egg production (%) | 43.21 ^b | 54.11 ^a |
| Average egg weight | 44.17 ^{ab} | 46.71 ^a |
| Feed conversion ratio | 4.43 ^b | 5.09 ^a |
| Mortality (%) | 6.25 ^a | 6.25 ^a |

Mortality rate between the treatments was the same. 6.2% died in each treatment throughout the experiment. Mortality recorded in this experiment was lower than 12% reported by Abdullahi [1] in his study with Shika Brown layer fed a commercial diet.

Table 4
Cost benefit analysis of the experiment

| Expenditure | Treatment | |
|-------------------------------|-----------------------|--------------------------------------|
| | 1 feed only | 2 feed + limestone as free Choice |
| Cost of feed consumed(₦) | 5797.86 ^{ab} | 6063.14 ^a |
| Cost of limestone consumed(₦) | - | 311.30 ^a |
| Medication(₦) | 183.33 | 183.33 |
| Cost of empty crates | 72 ^b | 90.00 ^a |
| Labour(₦) | 666.67 ^a | 666.67 ^a |
| Total | 6719.86 | 7314.44 |
| revenue | | |
| Sales of eggs(₦) | 10890 ^b | 13635 ^a |
| Total | 10890 | 13635 |
| Gross margin | 4170.14 ^b | 6320.56 ^a |

Table 4 shows cost and returns of treatment 1 and 2. Birds for treatment had consumed diet worth of 87.15% of the total cost of production. While treatment 1 had cost of feed which represents 86.28% of the total cost of production.

This is similar to 88% total cost of production reported Abdullahi [1]. Cost of medication, labour and empty crates accounts for 13.72% and 17.11% for treatment 1 and 2 respectively.

Revenue was generated from the sales of eggs. Birds fed limestone generated significantly higher revenue compared to control group (1) with values of ₦13635 and ₦10890 respectively. The high revenue generated by the birds fed limestone was accompanied by a high margin of ₦6320.56 which was significantly better than that recorded for control group ₦4170.14.

4. Conclusion and Recommendation

It could be concluded that limestone has no detrimental effect on the birds and improve their performance.

Base on the present study I would like to suggest that, further studies with other breeds of poultry should be conducted to monitor production to ascertain the importance of using limestone as free choice in the diet of laying birds.

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