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RESEARCH ARTICLE

INTERNAL QUALITIES OF EGG(S) OF LAYING BIRDS FED DIETS CONTAINING *VERNONIAAMYGDALINA*LEAF (BITTER LEAF) MEAL AT DIFFERENT GROWING PHASES

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Abstract

One hundred and twenty eight Isa-Brown pullet chicks were used for this study to determine the internal qualities of egg(s) from birds fed diets containing *Vernoniaamygdalina* leaf meals at different growing phases. The leaves used were air-dried, crushed and milled, and was then incorporated into the experimental treatments (T_2, T_3, and T_4) at 2% inclusion each. The birds were randomly allotted into four dietary treatments (T_1, T_2, T_3 and T_4) and each treatment was replicated four times with each replicate having 8 birds from the chick phase to the growing phase, thereafter 6 birds per replicate were randomly picked at the laying phase (point of cage), with T_1 serving as the control treatment throughout the experimental period of 39weeks. The parameters measured include egg weight, shell weight, shell thickness, shell height, yolk weight, yolk height, yolk width, albumin length, albumin height, albumin weight, while yolk index and Haugh unit were calculated. The result of the experiment showed that T_3 with 2% inclusion of *Vernoniaamygdalina*from the growing phase had the best shell thickness, yolk color and acceptable value for Haugh unit. Other parameters measured showed that yolk weight, and Haugh unit were significant at ($p<0.05$) with 2% inclusion of *Vernoniaamygdalina*. Every other parameter measured showed no significant difference across the treatments at ($p>0.05$). The result showed that 2% inclusion of *Vernoniaamygdalina*leaf meal at the growing phase of the experiment improved the internal qualities of eggs.

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Introduction:-

The external and internal quality of egg is influenced by a broad range of factors since egg quality criteria include several diverse and vital aspects as safety, nutritional and organoleptic properties or technological properties for cooking, all of which must be controlled from farm to fork. For all associated with poultry (breeders, farmers, egg

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sorting, food, and marketing companies), the main priorities are to deliver a safe product which is accepted by the consumers. The nutritional value of the egg will be important when extra value is added because of the enrichment of egg in specific nutrients such as fatty acid, vitamins or trace elements and this can be achieved by the use of some feed additives. Feed additives are ingredients added to poultry diets to enhance production efficiency, improve health or reduce morbidity (FAC, 1998) and are typically used in small quantities. They are classified into both inorganic (agrochemicals such as antibiotics) and organic (products derived from plants *e.g*. *Vernoniaamygdalina*which are used in feeding animals to improve their performance (Nakatani, 2000) in the poultry industry.

(Olobatoke&Oloniruba, 2009) reported that the powder of *Vernoniaamygdalina* (VA) leaves was able to increase feed conversion efficiency of cockerels without affecting their hematological profile. *Vernoniaamygdalina* may provide antioxidant benefits (Erasto*et al*., 2007). This study aims to provide information on the effects of *Vernoniaamygdalina*leaf meal on internal egg qualities which will in the near future be of importance to pursue the improvement of egg quality.

Objective:-

To evaluate the internal qualities of the eggs produced by laying birds fed diet containing *Vernoniaamygdalina* leaf (bitter leaf) meal at different growing phases.

Materials and Methods:-

The experiment was carried out at the poultry unit of the Federal College of Animal health and Production Technology, Moor Plantation, Ibadan.Materials used include quality wood shavings, feeders, waterdrinkers, light for brooding, nylons, battery cage, weighing scale, micrometer screw gauge, Venier caliper, and Roche yolk color fan. Day old chicks were acquired from a reliable and reputable hatchery in Ibadan, Oyo state. A total number of 128 birds were used to start the experiment from day old and at point of cage was reduced to 96 which were randomly picked. The experiment was designed to have 8 birds / replicate at chick phase and later reduced to six birds/ replicate to ensure uniformity between the replicates. Feed and water were given ad-*libitum*; vaccination and medication were done according to the hatchery's specification. The experiment lasted for 39 weeks. The *Vernoniaamygdalina*leaves used was sourced from an orchard in Ibadan, the leaf was detached from the stem and air-dried for 5-7days, thereafter it was crushed, milled into powdery form and incorporated into the diets as additive.

Treatment one (T_1) served as the control while the other treatments (i.e. Treatment 2, 3, 4) were given feed with the inclusion of 2% of the leaf meal (bitter leaf) at different stages of growth of the experimental birds {i.e. some had the inclusion starting the from chick phase (T2), some from the growing phase (T3) and the last from the laying phase (T4).Three eggs were picked from each replicate on a particular day of each week, making a total of 48 eggs / week for ten weeks. Data such as egg weight, shell weight, shell thickness, shell height, yolk weight, yolk height, yolk width, albumin length, albumin height, albumin weight were measured, while yolk index and Haugh unit were calculated.Data collected was subjected to One-way Analysis of Variance (ANOVA) using SPSS 17.0. The means were separated using Duncan Multiple Range Test (DMRT).

Table 1:- Internal egg quality parameters of birds fed diets containing*Vernoniaamygdalina*leaf meal at different phases of growth.

Parameters	T1 (0%)	T2 (2%)	T3 (2%)	T4 (2%)	SEM ±
Egg weight (g)	53.05	52.07	52.94	54.53	0.51
Shell thickness (mm)	0.32^{b}	0.33^{ab}	0.34^{a}	0.33^{ab}	0.03
Shell weight (g)	5.58	5.56	5.62	5.55	0.07
Albumen length (cm)	5.82^{b}	5.73^{b}	6.18^{a}	5.97^{ab}	0.06
Albumen weight (g)	33.79	31.16	34.31	33.13	0.54
Yolk weight (g)	13.34^{b}	14.82^{a}	13.47^{b}	14.05^{ab}	0.20
Yolk colour	1.10^{b}	2.48^{ab}	2.72^{a}	2.50^{ab}	0.19
Yolk index	39.93	40.27	38.59	39.25	0.53
Haugh unit	83.44^{a}	80.26^{ab}	76.91^{b}	81.09^{ab}	0.97

^{a,b}Means along the row with different superscript are significantly different.($P<0.05$)
SEM: Standard Error of Mean

Discussion:-

The results (Table 1) indicated that there were no significant differences across the treatments in parameters such as egg weight, shell weight, albumen weight and yolk index *i.e.Vernoniaamygdalina* leaf meal had no effect on the weight of the eggs produced. This may be due to the fact that increase in egg weight depends on lots of factors such as age, heat influence, lighting program, nutrition and not just feeds.On the other hand, there were significant differences in the shell thickness and yolk color at 2% inclusion level of the leaf meal in treatment three (T_3) and also a reduction in the yolk weight which implies an increase in the albumen weight which dictates the quantity of egg protein and the increase in shell thickness of the treatment three (T_3) will favor marketability of the egg according to (Melesse*et al*., 2010) as this reduces breakage. The increase in shell thickness at T_3 may be due to the fact that the calcium absorption and utilization was improved with consumption of the leaf meal at the growing phase.

The increase in yolk color increases the egg acceptability by consumers (Nys, 2000), this means that there was a common association between yolk color and acceptability of eggs as food. This implies that, in addition to other factors that could aid yolk coloration, birds on T_3 were able to utilize the β-carotene present in *Vernoniaamygdalina* leaf better than the other treatments The value recorded for the Haugh unit (which indicates the freshness of egg) fell within the range recommended for high quality eggs (Coutts and Wilson, 1990;Bello *et al*., 2011)

Conclusion:-

The inclusion of 2% *Vernoniaamygdalina*leaf meal (VALM) in the diet of birds from growing phase (T_3) had the best quality (shell weight, yolk color and the least yolk weight) as these all address consumers' preference for egg consumption.

Recommendation:-

It is therefore recommend that 2% *Vernoniaamygdalina* leaf meal (VALM) be included in the diet of pullets from the growing phase, as it addresses consumers request for golden yolk colour which improves egg marketability.

Further research should be carried out on the use of *Vernoniaamygdalina* leaf meal (VALM) at different inclusion levels at different phases of growth, so as to have a wider basis for comparison and to establish its optimum inclusion in the diet of pullets.

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