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PERFORMANCE OF LAYERS BIRDS FED *Telferia occidentalis* (Hook F.) STALK AS SUPPLEMENT AND PARTIAL REPLACEMENT OF SOYA BEAN MEAL

Eniola.O., Okeke, E.N., Adeyemo, J.O., Abegunrin, O.O. and Joshua, O.O
Federal College of Forestry, P.M.B. 5087, Jericho, Ibadan
larryeny2009@yahoo.co.uk

ABSTRACT

This study was conducted to evaluate the performance characteristics, laying potential and egg quality of layers fed *Telferia occidentalis* stalk meal supplement as a partial replacement for Soyabean meal. A total of ninety six points of lay harco black birds with average weight of 536g were allotted into four dietary treatments T1, T2, T3 and T4 in a completely randomized design (CRD). Each treatment was replicated three times with two birds per replicate. The basal diet was formulated to contain Metabolisable Energy (ME) 2700kcal/kg) and crude protein (CP) 16%. The control diet (T1) was a standard layers diet without *Telferia occidentalis* stalk meal, the second treatment (T2) was also standard layers diet with *Telferia occidentalis* stalk meal inclusion at 25%, while in diets 3 and 4 *Telferia occidentalis* stalk meal was added at 50 and 75% respectively. Parameter assessed includes feed intake, final weight gain, feed conversion ratio, and clutch weight of eggs. The result of thisstudy revealed that the dietary treatment had no significant difference ($p>0.05$) in the feed conversion ratio (1.93, 1.55,1.70,1.49) respectively and feed intake (845.50g, 838.66g, 835.66 g, 852.16g) respectively and final weight gain (436.66g, 538.33g, 490.00g, 571.66g). There was significant difference ($P<0.05$) in the weight of eggs (33.50g, 56.45g, 26.00g and 52.08g). There was an increase in weight of egg (33.50g, 56.45g, 26.00g, and 52.08g) as duration of the experiment progressed. Inclusion of *Telferia occidentalis* stalk meal brought about a decrease in the total cost of feed (from #10000 to #8,560 per 100kg of feed). From the study above addition of the test ingredient at 25% replacement for Soya bean meal component had the best performance in terms of the number of eggs laid and individual egg weight of the birds.

Key words: Layers, *Telferia occidentalis* stalk meal, Performance, Feed intake, egg, Soya bean meal,

INTRODUCTION

Poultry plays a significant role in the provision of animal protein required by man to meet his daily protein intake .Poultry meat and eggs offer considerable potential for bridging the protein gap in view of the high yielding exotic poultry that are easily adapted to our environment (Maidubike, 2000). Rising cost of poultry feeds is about 65 to 70% (Nworgu *et al.,* 2007) and 70 to 85% of total cost of production compared to about 50 to 60% in developed countries {Tackie and Flensher, 2003}. Therefore, there is need to look for locally available, affordable and relatively cheap all year round feed sources of unconventional protein and mineral supplements that will encourage growth of the birds, thereby reducing cost of production. Hence, widely cultivated vegetable in the tropic and subtropics known as Fluted Pumpkin (FP) (*Telferia occidentalis*) needs to be turned attention towards exploitation of its leaves extract and hooks as protein and mineral supplements in poultry nutrition.

Ifon and Basir (2003) noted that leafy vegetables supply minerals, protein and vitamins, thereby complementing the inadequacies of most feedstuffs Farinu *et al.,* (2006) reported that the protein from leaves may be recovered and fed to animals as solution in form of protein concentrates. The shortage of animal protein particularly in developing countries like Africa and Nigeria as a case study has necessitated investigations of several novel sources of protein. This acute shortage of protein had been attributed to the phenomenal rise in the price of animal feeds which accounts for about 75 to 85% of the recurrent productions cost in intensive monogastric animal production in Africa Fetuga, 1977. This has escalated prices of animal products and by-products thus making animal protein generally beyond the reach of the average citizens in the developing countries. The net effect of the deficit is manifested in the prevalence of various diseases such as kwashiokwor, maramus (Onwudike and Oke, 2006) and mental deficiencies. The ban on importation of agricultural raw materials has led to an acute shortage of caloric sources, deprivation of foreign investors and as a result the feed mill industry is currently witnessing a down turn output, efficiency and capacity utilization. It is obvious that all these factors have contributed to the rising prices of animal feeds. With the growing awareness of many Nigeria homes and regards to the prevalence of various forms of infections which are possible consequences of the protein shortage, there have been widespread interests in animal farming. However, this interest is jeopardized by the rising cost of major protein concentrates such as Fishmeal, Soyabean, groundnut cake etc.

Among the widely available unconventional feed ingredients are vegetables. The green vegetables has long been recognized Byers, (2002) as the cheapest and most abundant potential source of protein because of ability to synthesize amino acids from a wide range of virtually unlimited and readily available primary materials such as Water, Carbohydrate and atmospheric Nitrogen (as in legumes).Vegetables form most valuable part of human diets and play an important role in maintaining good health due to the presence of protein, mineral element and vitamins (Topps, 2000). It was also reported that relative fraction of a major dietary component such as cereal grains, maize has been replaced with vegetables on an equivalent dry matter basis without any physio-pathological changes in the performance, digestion and metabolic activities in the animals (Toops, 2007). It is also suggested that vegetables are acceptable, palatable and relatively safe feed to animals, but inclusion into feeds should be done with caution because of the presence of some major anti-nutritional factors in the vegetables which may adversely affect the general performance of the animals (Fasuyi *et al*., 2005).

This study assessed the potentials of *Telferia occidentalis* as a leafy vegetable protein source in diets of laying hens with special reference to the egg laying performance and its quality. {It is therefore pertinent that some efforts will be geared towards improving the per capital animal protein consumption of the developing countries through the incorporation of relatively less expensive ingredients as feedstuffs. Provision of low-cost and high protein feeds from local materials for layers is a challenge for developing countries. At present, there are few number of complementary feeds manufactured in Nigeria from locally available food sources. Only a small sector of the community can afford to feed their bird with imported feeds. There is an urgent need to conduct studies that help in production of low cost nutritional complementary diet based on locally available materials such as *Telferia occidentalis* hooks which is mostly thrown away by the market women after extracting their leaves as vegetable soup and evaluate their composition and properties.}

MATERIALS AND METHODS

Experimental Site

The experiment was carried out at the Agricultural Extension and Management Units of the Teaching and Research Farm, Federal College of Forestry, Ibadan. The site (Latitute$7^0$9N; Longitude $3^0$58W) is located in the rain forest vegetation of the southwest Nigeria with a mean rainfall of about 1300-1500mm and average relative humidity of about 80-85% (FRIN, 2006).

COLLECTION AND PREPARATION OF *Telferia occidentalis* ***hooks***

Freshly harvested fluted pumpkin (*Telferia occidentalis*) hooks was collected from different markets such as Dugbe, Eleyele, Bodija and Omi-Adio markets in Ibadan Nigeria. The fresh hooks was immediately subjected to sun drying in an open cleaned concrete floor space until moisture content became constant at about 13%. The sun dried leaves was later mill using a locally fabricated milling machine. The milled *Telferia occidentalis* (TOHM) was collected in jute bags and tightly tied to forestall the attack of insects and other pests. They were kept in a clean, well ventilated room prior to the feed formulation to ensure that the quality was maintained. Thereafter, the TOHM was used to formulate diets along with other ingredient purchased locally from nearby feed mill in Ibadan.

Experimental design

Ninety six point of lay birds were purchased from a well reputable poultry farm in Ibadan and were randomly allocated into a four dietary treatments represented as treatment 1 (T1), treatment 2 (T2), treatment 3 (T3) and treatment 4 (T4). The experiment was laid in Complete Randomized Design (CRD). The birds were randomly allotted into individual cages with consideration for a uniform average weight, replicated thrice under four dietary treatments. Eight layer birds was use per replicate. The bird was given 7 days for stability and thereby placed on

experimental diet. The birds were given feed and water throughout the entire experimental period of 6weeks (42days).

Table 1: Composition of the experimental diets

INGREDIENT	T1 (O level)	T2 (25%)	T3(50%)	T4(75%)
Maize	52.00	52.00	52.00	52.00
Soyabean	6.00	4.50	3.00	1.50
Groundnut cake	12.00	12.00	12.00	12.00
Wheat offal	15.00	15.00	15.00	15.00
Palm kernel cake	7.00	7.00	7.00	7.00
Bone meal	2.50	2.50	2.50	2.50
Limestone	4.50	4.50	4.50	4.50
Salt	0.30	0.30	0.30	0.30
Layer premix	0.25	0.25	0.25	0.25
Methionine	0.30	0.30	0.30	0.30
Lysine	0.15	0.15	0.15	0.15
TOSM	0.00	1.50	3.00	4.50

DATA COLLECTION

Data were collected daily on feed intake by subtracting the weight (g) of the feed initially offered from the left over feed remaining, while feed efficiency were computed by calculating the amount of feed consumed in relation to the amount of egg laid per dozen. The percentage hen-day production was computed as the percentage of the total number of eggs over the total number of days by number of hen i.e

$$\textbf{\% Hen day production} = \frac{\text{Total number of egg}}{\text{Total No of days x No Hens}} \times \frac{100}{1}$$

Egg production were determined by collecting eggs laid per replicate everyday and pooling them together for counting at the total collection of twenty one days. All eggs were supplied for weight by collecting the fresh eggs per replicate per day and then weighing. The various weights were recorded against each replicate and were later determined at the end of the experimental period.

Mortality = $\frac{\text{No of birds that died}}{\text{No of birds housed}} \times \frac{100}{1}$

Average daily feed intake: This was recorded as the total feed consumed per number of birds taken at the end of every week throughout the period of the experiment divided by the total number of days of the experimental period.

Total weight gain: The birds were weighed at the beginning of the experiment and weekly thereafter; the gains for each week were obtained by the differences.

Total weight gain: Final weight-Initial weight

Feed Conversion Ratio: This implies total number of feed intake all over weight gained

Feed Cost Analysis

The cost of each experimental diet, average cost of actual feed consumed by experimental laying hens on each dietary treatment and the feed cost per kg egg produced by laying hens on each dietary treatment was calculated by making use of the unit cost of each ingredient used in the diet formulation, average feed consumption values obtained during the experiment and the weight in kg of eggs pooled for each dietary treatment.

Statistical Analysis

Data obtained were subjected to statistical Analysis of Variance (ANOVA), using the general linear modeling procedure while Duncan Multiple Range Test (1955) was used to separate their means.

RESULT AND DISCUSSION

Table 3: Proximate composition of *Telferia occidentalis* Stalk Meal (TOSM) and Soya Bean Meal (SBM)

Composition (%)	*Telferia occidentalis*	Soya bean Meal
Crude protein	43.60	44.00
Crude Fibre	8.40	6.50
Ether Extract	9.60	3.50
Nitrogen Free Extract	29.10	28.60
Ash	9.30	6.00
Dry Matter	88.86	78.00
Metabolisable Energy (Kcal/kg)	3.60	2.99

The proximate composition shows that *Telferia occidentalis* Stalk meal had Crude Protein content of 43.60%, Crude Fibre 8.40%, Ether Extract 9.60%, Ash 9.30%, Nitrogen Free Extract 29.10% and Metabolisable Energy of 3.60 Kcal/kg which is higher than the composition of the Soya Bean Meal. This confirms that *Telferia occidentalis* Stalk Meal could be used as an alternative for Soya Bean Meal because both have similar compositional content. Also *Telferia occidentalis* stalk meal is a good source of essential and non- essential vitamins with a high percentage of vitamin E which play remarkable role in reproductive processes, {Ravidran, 2001}.

Table 4: Performance of layers Birds fed diets supplemented with *Telferia occidentalis* Stalk as a partial replacement for Soya bean meal

Parameters	T1	T2	T3	T4	SEM
Feed conversion ratio	2.0450[a]	1.5900[a]	1.7733[a]	1.6600[a]	0.0854
Efficiency Feed Utilization	0.51[a]	0.64[a]	0.58[a]	0.67[a]	0.026
Number of Eggs	22.15[b]	30.43[a]	12.72[c]	24.65[ab]	3.65
Weight of Eggs	33.5000[ab]	56.4583[a]	26.0000[b]	52.0833[a]	4.6732
Feed Intake	845.5000[a]	838.6667[a]	835.6667[a]	852.1667[a]	10.8864
Final weight gain	436.6667[a]	538.3333[a]	490.0000[a]	571.6667[a]	22.1156

[abc] Means with different superscript on the same row are significantly different (P< 0.05)

Key: T1- T4 = Treatments. SEM=Standard Error of Mean

From table 4 above, the final weights gained (g), of birds fed diet 4 gave the highest mean value of 571.67g, There was no significant (p>0.05) difference among birds that were given diets 1, 2 and 3 which had mean body weights gained of 436.67g, 538.33g and 490.00g respectively. Layers birds on diet 2 had similar body weight compared to birds that were fed diet 4. Similarly, the body weight of birds on diet 3 was closer to that of birds on diets 1. Layers birds on diet 1 that were fed with diet without *Telferia occidentalis* hooks meal had the lowest performance in terms of final weight and weight gained.

The feed intake (g) of birds fed diets 1, 2, 3, and 4 were, 845.50(g), 838.67 (g), 835.66 (g) and 852.66 (g) respectively. There were no significant (p<0.05) differences in the feed intake among all the dietary treatments. Birds that were given diets 4 had the highest feed intake and birds on diet 3 had lowest feed intake. Layers birds on experimental diets 1 consumed up to 1 (kg) of feed but were only able to gain weight of 436.66 (g) which was lower than (NRC, (1994)) recommendations. This smaller weight gained in treatment one might be obviously be due to no inclusion of *Telferia occidentalis* hooks meal in the diets. The feed conversion ratio of birds fed diets 1, 2, 3, and four were 2.04, 1.59, 1.77 and 1.66 respectively. There was no significant (p>0.05) differences in the feed conversion ratio among all the treatments. Birds on diet 2 gave the lowest feed conversion ratio 1.59 and birds that

were fed diets one had the highest feed conversion ratio 2.04. Birds on diets two had better performance than the rest of the birds on other treatment because the lower the feed conversion ratio the better would be the performance.

CONCLUSION

This study revealed that *Telferia occidentalis* hooks, which most people refer to as waste products and ignorantly discarded away is a good source of protein and other micro nutrients that are contained in soya bean meal. In other word *Telferia occidentalis* hooks can be used to replace soya bean meal since it is readily available, affordable and has low anti-nutritional factor. Its inclusion in layer diet at 25% performed better in term of weight of eggs and over all performance. *Telferia* occidentalis hooks inclusion above 25% may not produce desirable result as expected; this may be due to high concentration of fibre in the *Telferia occidentalis* hook which may be higher than the tolerable level in layers.

RECOMMENDATIONS

Base on the results and physical observations of the study, the following recommendations are being made to be considered:

1. That the *Telferia occidentalis* hooks meal is a potential mineral, protein, vitamins source that can be conveniently used to replace soya bean meal in the diet of layer birds and other livestock~~'~~s.
2. That it's inclusion in the diet for partial or full replacement of soya meal in layers diet should be further researched to know its appropriate level of inclusion and levels at which it will perform best.

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