

THE EFFECT OF FALSE YAM (*Ipomoea batatas*) TUBER MEAL ON PRODUCTIVE AND REPRODUCTIVE PERFORMANCE OF BREEDER LAYERS

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ABSTRACT

A 12-week study investigated the effects of processed false yam (*Ipomoea batatas*) tuber meals on the productive and reproductive performance of breeder layers. Unboiled-sundried (SDFYTM) and boiled-sundried (BSDFYTM) false yam tuber meals were incorporated as partial replacement of maize in the diet such that Diet 1 contained no false yam (control). BSDFYTM was incorporated at 3% and 6% for diets 2 and 3 respectively. SDFYTM was also incorporated at 3% (Diet 4) and 6% (Diet 5). A total of 120 local-exotic crossbreds (100 hens and 20 cocks) of age 43 weeks old were used in a completely randomized design. Each treatment had 4 replicates with a replicate made up of five hens and one cock. Parameters measured included feed intake, feed conversion ratio (FCR), hen-day egg production, egg weight, fertility and hatchability of eggs. Results showed that false yam significantly reduced feed intake ($P<0.0001$) compared to the birds on the control diets, while 6% SDFYTM significantly increased feed conversion ratio. Both BSDFYTM and SDFYTM at 3% inclusion reduced feed cost per gain compared to the control diet. Hen-day egg production was significantly better for the birds receiving the 3% BSDFYTM ($P<0.0001$), while the addition of 6% SDFYTM gave the poorest results. The 6% inclusion level of SDFYTM significantly ($P<0.05$) decreased fertility rate, hatchability, and saleable chicks but increased the dead-in-shell. It was concluded that BSDFYTM at 3% and 6% and SDFYTM at 3% level could be added to breeder layer diets without any adverse effect on productive and reproductive performance

Keywords: Breeder layers, false yam, hatchability, saleable chicks

INTRODUCTION

The poultry industry plays a critical role in Ghana's economy by providing high-quality animal protein in the form of meat and eggs, income generation and improved livelihoods in both the urban and rural areas (Agyei-Henaku, 2016). The population of Ghana is increasing at an estimated annual rate of 3% leading to a higher demand for maize, fish, and soybeans, which are staples in the average Ghanaian diet but are not produced in sufficient quantities locally (Osei et al., 2013). Maize, soybean meal, and fishmeal

are also primary components of poultry diets. Shortages in these feed ingredients lead to increased prices during the lean season and hinder sustainable and profitable poultry production.

Feed accounts for 60% to 75% of the total recurrent cost of commercial poultry production (RVO, 2020). Maize and fishmeal/soybean meal are the primary sources of energy and amino acids, respectively, making up over 60% of the poultry diet (Rendon and Ashitey, 2011; Signorelli et al., 2017). Given the annual shortages in maize and protein ingredient supply, research

has been ongoing for decades to explore non-conventional feed resources that can replace conventional feed ingredients (Apata and Ojo, 2000). These non-conventional feedstuffs include cereal brans (Smith, 1990), oilseed cakes (Nelson, 1998), dried cassava peel (Osei and Duodu, 1988; Dairo, 2011), dried cashew nut testa (Donkor and Zanu, 2010), food crops (Smith, 1988), crop residues such as cassava leaf meal (Okai *et al.*, 1984; Siaka and Devi, 2015), and new plant resources such as false yam (Dei *et al.*, 2011).

False yam (*Ipomoea pes-caprae*) is a drought-resistant, small perennial shrub primarily harvested for its edible tuberous root and seeds (Fay, 1987; NRC, 2008). The tuberous roots contain 80% carbohydrates and have been used as emergency food during drought and famine when other crops fail (Dei *et al.*, 2011). Although false yam grows abundantly in the Northern sector of Ghana, it is not typically consumed as a human food and is therefore not harvested. However, false yam tuber meal can potentially replace maize as an energy source for poultry (Dei *et al.*, 2011). Nevertheless, raw false yam contains toxic resins that have anti-nutritional effects in chickens. Processing of the false yam could remove or minimise the toxic effect and improve the feeding value.

This study was conducted to determine the suitability of processed false yam as a poultry feed ingredient, (boiled or unboiled and then sun-dried) on the productive and reproductive performance of breeder layers.

MATERIALS AND METHODS

Location of study

The study was carried out at the Department of Animal Science, Faculty of Agriculture, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana.

Preparation of false yam tuber meal

False yam tuber meal was prepared as described by Dei *et al.* (2011). Briefly, the underground tubers were harvested from plants of unknown ages and peeled using a knife. Peeled tubers were cut into smaller pieces measuring approximately 2–3cm (length by breadth) to facilitate drying. The cut tubers were then divided into

two groups and further processed according to the various treatments. Tubers for the SDFYTM treatment were spread on a concrete floor and dried in the sun for seven days. Tuber pieces meant for the BSDFYTM treatment were first boiled (100°C) in water for two hours and then dried in the sun for nine days. The two groups of tuber pieces were separately milled through a hammer mill of sieve size 2 mm to make the meals.

Proximate composition of false yam tuber meals

Five-gram representative samples of both BSDFYTM and SDFYTM were analyzed for their proximate composition at the nutrition laboratory of the Department of Animal Science (KNUST) following the procedures of the Association of Official Analytical Chemists (AOAC, 1990). Dry matter (DM) was determined using a convection oven at 105°C (AOAC 930.15 and 925.10) and nitrogen (N) using the Dumas total combustion method (AOAC 968.06). Crude protein (CP) content was calculated as N x 6.25. The ash content was measured by placing samples in a furnace at 550°C (AOAC 942.05), while ether extract (EE) was determined by the Soxhlet extraction method (AOAC 991.36), and crude fibre (CF) was determined following AOAC method 985.29.

Duplicate samples were analysed.

Experimental birds, dietary treatments and experimental design

One hundred and twenty 43-week-old breeders made up of one hundred hens (average live weight of 1.67kg), and twenty (20) cockerels (average live weight of 1.7kg) were randomly selected from a local-exotic crossbred population from the Department of Animal Science, KNUST. The experimental birds were allocated to five treatment groups with four replicates. Each replicate contained five hens and one cock in a completely randomised design. The experiment lasted for twelve (12) weeks. Each treatment group received a maize-based layer diet containing 16% CP and 2660 kcal/kg of metabolizable energy. In treatments (T) 2-5 maize was replaced with either BSDFYTM (T2 and T3) or SDFYTM (T4 and T5) at the rate of 3 or 6%, respectively. Birds were allowed to adapt to the

feed for seven days and their initial live weights were then taken on day 8. Feed and water were given *ad libitum* throughout the experimental period.

Incubation of eggs

The first collection of hatching eggs was done 10 days after cocks were introduced to the hens. Subsequently, eggs were collected for seven

days for weeks 3, 5, 7, 9 and 11. Eggs collected from layers for the week were sent to the Olympic Hatchery at the Department of Animal Science, KNUST, for incubation and hatching. Eggs for hatching weighed between 55 and 60 g and dirty, misshapen, small and cracked eggs were rejected. Selected eggs were set large end up in a Jamesway PS501 incubator which turns every hour. Candling was done on day 18 to

Table 1: Composition and calculated analysis of layer diets

| Ingredients (kg) | Treatment | | | | |
|------------------------------------|------------|------------|------------|------------|------------|
| | Control | 3% BSBFYTM | 6% BSBFYTM | 3% SDFYTM | 6% SDFYTM |
| BSDFYTM | 0 | 3.0 | 6.0 | 0.0 | 0.0 |
| SDFYTM | 0 | 0.0 | 0.0 | 3.0 | 6.0 |
| Maize grain | 58 | 55 | 52 | 55 | 52 |
| Fishmeal | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Soyabean meal | 11 | 11 | 11 | 11 | 11 |
| Wheat bran | 15 | 15 | 15 | 15 | 15 |
| Oyster shell | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 |
| Sodium chloride | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Premix ¹ | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Dicalcium phosphate | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Total | 100 | 100 | 100 | 100 | 100 |
| Calculated nutrient content | | | | | |
| Crude protein | 16.03 | 15.96 | 16.15 | 15.92 | 16.08 |
| Ether extract | 3.76 | 3.67 | 3.58 | 3.68 | 3.61 |
| ME (Kcal/kg) | 2660 | 2670 | 2680 | 2656 | 2660 |
| Calcium | 3.71 | 3.60 | 3.61 | 3.60 | 3.61 |
| Available P | 0.60 | 0.59 | 0.58 | 0.59 | 0.58 |
| Methionine | 0.31 | 0.30 | 0.29 | 0.30 | 0.29 |
| Cystine | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 |
| Lysine | 0.87 | 0.85 | 0.87 | 0.85 | 0.87 |
| Tryptophan | 0.19 | 0.19 | 0.19 | 0.19 | 0.11 |
| Arginine | 1.02 | 1.03 | 1.04 | 1.03 | 1.04 |
| Isoleucine | 0.67 | 0.66 | 0.65 | 0.66 | 0.66 |

¹Vitamin mineral premix provided the following per kg of diet: vitamin A, 10,000 IU; D, 400,000 IU; E, 3,000 IU; K, 2,000 IU; B₁, 200 mg; B₂, 900 mg; B₁₂, 2,400 mg; niacin, 5,000 mg; Fe, 900 mg; Cu, 500 mg; Mn, 12,000 mg; Co, 1000 mg; Zn, 10,000 mg; Se, 4mg

remove infertile eggs. The fertile eggs were transferred to a Jamesway PS501 hatcher immediately after candling. Eggs were set in trays and then fumigated with formaldehyde before being placed in the incubator.

Data collection

Data were collected for both production and reproductive parameters. The production parameters were: initial weight, final live weight, daily weight gain, mean feed intake, feed conversion ratio (FCR), feed cost per kilogram diet, the economy of gain/feed cost per gain, hen-day production, egg weight and mortality rate. Reproductive parameters included egg fertility rate, hatchability of fertile eggs and total eggs set, dead-in-shell chicks, mortality and saleable chicks

The fertility rate was calculated as a fraction of the total number of fertile eggs of the total number of eggs set expressed as a percentage. Mathematically,

$$\text{Fertility rate (\%)} = \frac{\text{Number of fertile eggs}}{\text{Number of total egg set}} \times 100\%$$

Hatchability

Hatchability of fertile egg(s) was expressed as the total number of eggs hatched by the total number of fertile eggs set multiplied by 100%.

Mathematically, hatchability of fertile eggs (%)

$$\frac{\text{Number of fertile eggs hatched out}}{\text{Number of fertile eggs}} \times 100\%$$

Hatchability of total eggs

Percentage hatched was calculated as the number of chicks hatched by the total number of eggs set multiplied by 100%.

Mathematically, it was represented as:

$$\frac{\text{Total number of chicks hatched}}{\text{total number of eggs set}} \times 100\%$$

Saleable chicks

Saleable chicks are chicks that hatched out with-

out any observable physical abnormalities. Per cent saleable chicks was calculated by subtracting dead and deformed chicks from the total hatched and multiplied by 100.

Dead-in-shell

Dead-in-shell refers to embryos that die without hatching and have to be manually removed from the shell. This was expressed as a percentage (%).

Mathematically,

$$\text{dead-in-shell} = \frac{\text{Total number of dead in shells}}{\text{total number of fertile eggs set}} \times 100\%$$

Post Hatch Mortality

Post-hatch mortality was defined as chicks dying within 60 minutes of hatching. The per cent post-hatch mortality was calculated as the number of post-hatch dead chicks divided by the total hatch of fertile eggs multiplied by 100.

Mathematically, it was represented as:

$$\frac{\text{Number of post hatched dead chicks}}{\text{total hatched of fertile eggs}} \times 100\%$$

Data Analysis

Measured parameters were analysed using the GLM procedure of SAS 9.3 (SAS Institute Inc., 2014) and means were separated using Duncan's multiple range test and were considered significant when the *P*-value was less than 0.05.

The statistical model included the fixed effect of 4 feed treatments:

$$Y_{ij} = \mu + \alpha_i + \alpha_e \quad (1)$$

Where Y_{ij} is the response to treatment, μ is the overall mean from the treatment, α_i is the fixed effect due to feeding treatment and α_e is the error effect.

RESULTS AND DISCUSSION

Proximate composition of BSDFYTM and SDFYTM

The proximate values of BSDFYTM and SDFYTM are presented in Table 2. BSDFYTM contained 5.25% CP, 71.77% NFE, 7.73% CF, 0.75% EE and 3.0% ash, whereas SDFYTM contained 7.01% CP, 67.59% NFE, 9.9% CF,

1.5% EE and 3.5% ash. In all cases, boiling followed by sundrying reduced nutrient contents except NFE. The reduced values may be due to increased solubility or volatilization in boiling water (Osei *et al.*, 2013). The proximate values obtained in this study fall within the range of values reported by other researchers (Dei *et al.*, 2011; Osei *et al.*, 2013; Sunday *et al.*, 2016). The proximate composition of feedstuffs is influenced by various factors, including processing methods, soil characteristics, climate, genetic resources (varieties/cultivars, breeds), and storage conditions (INFOODS, 2022).

Feed intake

Birds on the processed false yam (sundried or boiled-sundried) consumed significantly

($P < 0.01$) less feed compared to their counterparts on the control diet (Table 3). Overall, birds receiving the false yam ate an average of 2.46kg, equivalent to 92% of the amount consumed by the control birds (2.68kg). Furthermore, birds receiving the 6% sundried false yam diet consumed significantly less ($P < 0.01$) than the other birds (Table 3). In addition, the feed intake of birds receiving SDFYTM was significantly lower than birds receiving BSDFYTM (2.41kg versus 2.53kg) (Table 3). The mean daily feed intake values followed the same trend. Similar observations have been made by Dei *et al.* (2011) in poultry and Dei *et al.* (2015) in guinea fowls. Dei *et al.* (2011) observed that boiling the tuber reduced the level of anti-nutritional factors, largely terpenes and gum resins, making the feed more palatable.

Table 2: Proximate composition of BSDFYTM and SDFYTM (% DM)

| Proximate fraction (%) | BSDFYTM | SDFYTM |
|------------------------|---------|--------|
| Moisture | 11.5 | 10.5 |
| Crude protein | 5.25 | 7.01 |
| Crude fibre | 7.73 | 9.9 |
| Ether extract | 0.75 | 1.5 |
| Ash | 3.0 | 3.5 |
| NFE | 71.77 | 67.59 |

Final body weight and body weight gain (kg/bird)

Birds on the 6% SDFYTM weighed less than those on the other treatments even though the differences were not significant ($P < 0.05$). On the average they lost 20g while the others gained an average of 67.5 g. Osei *et al.* (2013) fed BSDFYTM at 50 and 100 g/kg in the diet of broiler growers and observed a negative effect on growth performance in contrast with Dei *et al.* (2011), who fed BSDFYTM in the diets of

Table 3: Effect of false yam on productive performance of layers

| Parameters | ¹ Treatment | | | | | SEM | p-value |
|-----------------------------|------------------------|--------------------|--------------------|--------------------|--------------------|------|---------|
| | 0% | 3% BSDFYTM | 6% BSDFYTM | 3% SDFYTM | 6% SDFYTM | | |
| Initial weight (kg/bird) | 1.60 | 1.58 | 1.63 | 1.65 | 1.65 | 0.04 | 0.643 |
| Final body weight (kg/bird) | 1.73 | 1.70 | 1.68 | 1.68 | 1.63 | 0.05 | 0.702 |
| Mean feed intake (kg/bird) | 2.67 ^a | 2.58 ^b | 2.46 ^c | 2.54 ^b | 2.25 ^d | 0.02 | <.000 |
| Daily feed intake (g/bird) | 134 ^a | 129 ^b | 124 ^c | 127.5 ^b | 113 ^d | 0.02 | <.000 |
| FCR (feed intake/kg egg) | 4.03 ^b | 3.36 ^b | 4.23 ^b | 3.83 ^b | 6.74 ^a | 0.32 | 0.001 |
| Hen day production (%) | 60.15 ^{bc} | 69.84 ^a | 53.90 ^b | 61.09 ^b | 34.37 ^d | 2.26 | <.000 |
| Feed cost (GH¢)/gain (kg) | 7.26 ^b | 6.02 ^b | 7.50 ^b | 7.25 ^b | 11.79 | 0.57 | 0.001 |
| Feed cost/kg (GH¢) | 1.80 ^a | 1.79 ^b | 1.79 ^b | 1.77 ^c | 1.75 ^d | 0.00 | <.000 |

^{abc} Means in a row followed by different subscripts differ significantly ($P < 0.05$).

¹Treatment, BSDFYTM- Boiled Sundried False Yam Tuber Meal,

SDFYTM- Sundried False Yam Tuber Meal, SEM- Standard Error of Means.

broiler chickens up to 90g/kg without any adverse effect on their growth. These results suggest that boiled-sundried false yam (BSDFYTM) can be included in layer diets at 3% and 6% inclusion levels without adversely affecting their growth.

Hen-day egg production

Birds on 3% BSDFYTM produced more eggs than the other treatment groups ($P < 0.05$). However, at 6% level of BSDFYTM, egg production declined sharply. The 3% SDFYTM was as good as the control diet (62% versus 60.2%). At 6% SDFYTM, egg production declined significantly ($P < 0.05$), and hen-day production reached only 35%, which was statistically lower ($P < 0.05$) than any of the other treatments. These results suggest that both BSDFYTM and SDFYTM may be added to layer diet up to 3% without having any negative effect on hen-day production, whereas boiled-sundried false yam tuber meal may be added up to 6% to improve egg-laying performance.

Even though there was no determination of anti-nutritional factors in the false yam meals for the experiment, various researchers have shown that boiling may reduce a significant portion of anti-nutritional factors from false yam and therefore improve layer performance (Dei *et al.*, 2011). Anti-nutritional factors are known to adversely affect layer performance through various metabolic processes. For example, Mohammed and Dei (2013) stated that adding SDFYTM will reduce protein utilization, while McDonalds *et al.* (2002) indicate that terpenes interfere with nutrient availability and reduce animal performance.

Feed conversion ratio

The feed conversion ratio for treatment 3% BSDFYTM and 6% SDFYTM significantly differed ($P < 0.05$) from the control group (Table 3). The results indicate a very good FCR at 3% BSDFYTM ($P < 0.05$); however, the inclusion levels of 6% BSDFYTM and 3% SDFYTM did not differ significantly from the control group. Although the feed was not analysed for anti-nutritional factors, the relatively higher figures of FCR recorded for the 6% inclusion levels of both BSDFYTM and SDFYTM could be attributed to the presence of anti-nutritional fac-

tors like terpenes, tannins, oxalates, and phytate in false yam. These factors could adversely affect animal metabolism (Frohne and Pfander, 2005, Sunday *et al.*, 2016). Some terpenoid components can act as toxins, growth inhibitors, or deterrents to animals (Gershenzon and Dudareva, 2007). Dei *et al.* (2011) reported a 39% reduction of total terpenes for boiled false yam tuber meal. This possibly means that adding high amounts of false yam meal, even when heat-processed, could still leave enough quantities of terpenes to affect growth and production adversely.

Cost per kg diet

The addition of processed false yam progressively reduced the cost of a kilogram of feed. The reduction in cost arises from the fact that the price of false yam is lower than that of maize, which it partially replaced. On average, the feed cost/kg diet was GH¢ 1.78 for both BSDFYTM and SDFYTM as against GH¢1.80 for the control, resulting in a cost savings of 2.27% for each kg diet incorporating false yam tuber meal. Using BSDFYTM and SDFYTM to replace maize partially can result in significant cost savings for a commercial poultry farmer. These savings can accumulate over time and be very substantial. The result of this experiment agrees with Osei *et al.* (2013), who recorded a decrease in the cost per kilogram diet with the addition of BSFYTM and SDFYTM.

Feed cost per gain

The least feed cost per gain was recorded for the 3% BSDFYTM dietary treatment birds, with the 6% SDFYTM birds recording the highest, which was equivalent to US\$2. The BSDFYTM at 3% of the diet reduced cost per gain because body weight gain was similar to those recorded for the control birds.

Layer mortality rate

No mortality was recorded in all the treatments, suggesting that the levels of false yam used in the trial had no adverse effect on the health of breeder hens.

Reproductive Parameters

The summary of the reproductive parameters (fertility, hatchability, saleable chicks, dead in shell and chick mortality) is shown in Table 4.

Fertility and hatchability of eggs

Egg fertility values tended to decline as false yam was added to experimental diets although the differences were not significant ($P > 0.05$). Fertility ranged from 79% for 6% SDFYTM eggs to 85% for 3% BSDFYTM eggs. These values compare favourably with those reported elsewhere. Abioja *et al* (2020) obtained values between 85 and 88 per cent in Nigeria. Wondmeneh *et al* (2011) obtained values ranging from 77% to 95 % for four breeds of chicken (Horro, Fayoumi, Lohmann Silver and Potchefstroom koekoek) in Ethiopia.

There were no significant differences in hatchability of fertile eggs among control eggs and those from BSDFYTM diets and averaged approximately 80 %. The addition of SDFYTM however drastically reduced egg hatchability ($P < 0.05$). Relative to control eggs, 3% and 6% SDFYTM diets reduced fertile egg hatchability by 23% and 29% respectively. The hatchability of total eggs followed a similar trend and suggests that sundried false yam tuber meal may not be incorporated in breeder diets. False yam is reported to contain several antinutritional factors including hydrocyanic acid, oxalic acid, tannins, phytic acid, alkaloids (Umoh, 2013) and terpenoids (Dei *et al* 2011). All these antinutrients

have an adverse effect on animal performance (Samtiya *et al*, 2020) although a direct link between them and egg fertility or hatchability has not been reported.

Saleable chicks

BSDFYTM at 3 and 6% and SDFYTM at 3% had no effect ($P > 0.05$) on the percent saleable chicks. SDFYTM at 6%, however, significantly ($P < 0.05$) reduced the percentage of saleable chicks. The percentage of normal saleable chicks ranged from 89.2 for 6% SDFYTM to approximately 80% for the control. Wondmeneh *et al.* (2011) reported saleable chick percentages ranging from 89.5 to 96.2 for breeder layers raised in Ethiopia.

Dead –in-shell

There was a slight reduction in the percentage of the dead-in-shell embryos as BSDFYTM was added compared to the control. On the other hand, both 3 and 6% SDFYTM significantly increased them (38.3 and 43.4%, respectively).

Post-hatch chick mortality

Chick mortalities were low and ranged from 1.0% to 2.0%; the implication is that low dietary levels of false yam (up to 6%) have little effect on post-hatch chick mortality.

Table 4: Effect of False Yam on Reproductive Performance

| Parameters | TREATMENTS | | | | | SEM | p-value |
|----------------------------------|-------------------|--------------------|--------------------|-------------------|-------------------|------|---------|
| | Control | 3% BSDFYTM | 6% BSDFYTM | 3% SDFYTM | 6% SDFYTM | | |
| Total eggs set | 270 | 270 | 270 | 270 | 270 | 0.60 | 1.00 |
| Fertility (%) | 84.8 | 85.3 | 82.3 | 81.3 | 79.1 | 3.34 | 0.68 |
| Infertile eggs (%) | 15.2 | 14.7 | 17.8 | 18.8 | 20.9 | 3.34 | 0.68 |
| Hatchability of fertile eggs (%) | 79.4 ^a | 80.42 ^a | 79.9 ^a | 61.7 ^b | 56.5 ^b | 5.42 | <.0001 |
| Dead in shell (%) | 20.0 ^b | 19.6 ^b | 20.0 ^b | 38.3 ^a | 43.4 ^a | 5.42 | 0.01 |
| Hatchability of total eggs (%) | 67.0 ^a | 68.8 ^a | 66.00 ^a | 51.2 ^b | 45.1 ^b | 5.59 | 0.001 |
| Saleable chicks (%) | 97.6 | 96.6 | 96.9 | 92.3 | 89.2 | 3.54 | 0.4192 |
| Post-hatch mortality (%) | 1.0 ^c | 1.3 ^b | 1.0 ^c | 1.0 ^c | 2.0 ^a | 0.04 | <.0001 |

^{ab} Means within a row with different superscripts are significantly different from each other

¹Treatment, BSDFYTM, Boiled Sundried False Yam Tuber Meal,

SDFYTM, Sundried False Yam Tuber Meal, SEM, Standard Error of Means.

CONCLUSION

The results indicate that up to 3% processed false yam may be added to breeder diets without any significant adverse effects on performance while reducing the cost of feeding. BSDFYTM added at 3% of the diet also improves the fertility and hatchability of eggs. On the other hand, the inclusion of 6% SDFYTM in poultry breeder diets reduces the percentage of fertility, hatchability, and saleable chicks while increasing the dead-in-shell numbers.

RECOMMENDATION

Farmers could add up to 3% of the boiled sun-dried false yam meal to their chicken diets without having any adverse effect on their performance.

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