Jher Vol. 33, No. 1, September 2026, pp. 220 - 231

Growth Performance and Cost Analysis of Broiler Birds' Finishers Fed Diets of Varying Ratios of Rice (*Oryza gaberrima*) Bran, Housefly Maggot Meal and Scent Leaf (*Ocimum gratissimum*)

[1]Bassey, Njorkun N., [2]Offiong, Agnes E. A., [3]Nwoye, Ebele G., [4]Abanyam, Victor A., [5]Kenneth, Beauty U; [6]Oko, Bernard, A.

[1 & 3] Dept. of Agricultural Education, University of Nigeria, Nsukka; [2] Dept. of Environmental Education, University of Calabar, Calabar (UNICAL); [4] Dept. of Agricultural Education, (UNICAL); [5] Dept. of **Sociology,** (UNICAL)

[6] Department of Curriculum & Teaching, (UNICAL)

Corresponding Author: grace.nwoye@unn.edu.ng

Abstract

The study investigated growth performance and cost analysis of broiler birds' finishers fed diets of varying ratios of rice bran, housefly maggot meal and scent leaf powder. The experiment was conducted in Agricultural Education Poultry Farm, University of Nigeria, Nsukka (UNN). A 3 x 4 factorial arrangement in a completely randomized design (CRD) was adopted. 216-day-old chicks from Aggrited farm were studied. The chicks were brooded together for three weeks, and distributed into four treatment groups- (T1, T2, T3 and T4). Each group had 54 birds with three replicates of 18 birds. Four diets containing varying ratios of rice bran and housefly maggot meal were formulated. Data on daily feed intake, weekly weight gain, and final body weight were collected via weighing scale, while data on feed conversion ratio and costs-benefits were computed. Data collected were analysed using mean and one-way ANOVA. Results reveal that Treatment 4 performed best in growth performance with highest average final body weight of 2786.67 g ($P < 0.05$). Treatment 4 also recorded the lowest average total cost of production of ₦51,168.85 ($P < 0.05$), highest average total revenue generated of ₦72,821.33 ($P > 0.05$), and highest average net profit of ₦21,652.49 ($P > 0.05$). Based on the results, it was concluded that inclusion of 15% rice bran and 30% housefly maggot meal as partial replacement for maize and fishmeal supplemented with 30ml scent leaf powder is ideal for broiler birds' finisher.

Keywords: Broiler, Growth, Performance, Cost-Benefit, Rice Bran, Scent Leaf, Housefly maggot, Finishers, Diets, Ratios.

Introduction

The poultry industry around the world continues to grow due to the increased demand for protein-based food products. Food and Agriculture Organization (FAO), (2022) reported that the total output of poultry meat on a global level stood at 135 million metric tons in 2022, showing a gradual increase from prior years. The United States, China, and Brazil are among the largest producers, contributing to the global poultry meat output. There have been major challenges faced by the global poultry industry due to increased costs of conventional feed resources, leading to the search for alternative feeds for growth.

Conventional feeds such as maize, soybean meal, and fishmeal form the core component of feed used in broiler chicken production. The high price of feed and feed ingredient costs is one of the common problems associated with the production of broilers especially in Nigeria (Bassey et al., 2023). This problem emanates from the increasing prices of these ingredients due to rising demand, leading to unprofitability in poultry production. Various efforts by researchers have concentrated on finding alternative sources of feed to ensure that they are both economical and healthy for the chickens. The nutritional qualities of some feed ingredients like rice bran, fly maggot meals, and scent leaf extract make them a suitable choice.

Broiler chickens (*Gallus gallus*) are the young chicks of either the male or female bird that grows from an initial weight of 38-40g to a body mass of 1.7kg within a six-week period. Broilers are domesticated by man as sources of meat and income (Bassey et al. 2023). Broiler meat is quite valued by many Nigerians due to its delicious taste, tenderness and nutritional benefits (Okey & Egede, 2021). The meat has 150 calories per 100g, has lower amounts of cholesterol compared to some other meats and also the fibres in the meat are very tender making it easy to masticate (Prabakaran, 2013). Because of the early maturing nature and the value of the meat obtained from broilers, a large number of individuals practice broiler farming. The development process of broilers can be subdivided into two groups namely; the starter group and the grower/finisher group. The broiler starters are the young broiler chicks of either sexes (male or female) grown for a period of 3 or 4 weeks. According to Bassey et al. (2023), the broiler starter chicks may be disposed of after their brooding for 3 or 4 weeks or moved into growers/finishers pen where they will continue brooding for another 3 or 4 weeks till they become adult broiler chickens. In other words, broiler finishers are broilers that have been brooded for 3 to 4 weeks old and then can be grown for another period of 3 to 4 weeks in grower's pen to mature into adult broilers. The type of feed, the housing facilities used, care and treatment given to the finisher broilers are quite different from starter broilers. The success of broiler production largely depends on the type of birds raised and the nature of their feed.

Broiler feed is sourced from various materials including sources of energy feed, protein feed sources, minerals, additives etc. According to Okosun & Eguaoje (2017), feed ingredients that constitute energy feeds include maize, sorghum and millet which make up 50-55 percent of any formulated diets. These feed ingredients make up the costliest feeds when formulating broiler feed. Moreover, important protein sources of feeds like fish meal and soybean meal are major challenges facing livestock farmers especially the broiler production due to the high prices of these materials. Fish meal is the most common animal protein source in feed formulations however at present, it is less affordable. Overall, protein sources have become less affordable. In order to address the problem of high cost of feed ingredients in monogastric farm animals such as poultry farming, there is need to explore new and unconventional feed ingredients. Exploration of unconventional feed sources like rice bran, housefly maggot meal, scent leaf extract and other ingredients will reduce costs of

production in poultry production (Zahir, 2020).

Rice bran is a valuable source of nutrients such as proteins, lipids, vitamins, and minerals. According to Bodie et al. (2019), rice bran is a product derived from the removal of the outside layer of the rice kernel. Rice bran has been found to increase growth rates and feed efficiency in poultry when used as an alternative to regular feed components such as maize (Bimrew et al., 2020). In terms of nutritional content, rice bran constitutes about 58% of the entire rice kernel and is nutritionally rich because it consists of 15-22% lipids, 34-52% carbohydrates, 7-11% fiber, 6-10% ash, 8-12% moisture and 10-16% protein (Bodie et al., 2019). The inclusion of rice bran will reduce the cost of feed because it is cheaper than normal feeds in the market (Lolig et al., 2022). On the other hand, housefly maggot meal is another non-conventional feed component that might be useful in broiler farming.

Housefly maggot meal obtained from the maggots of housefly has been found to be a very sustainable protein source that is highly digestible and has a great amino acid composition (Saji et al., 2020). Some research has shown that broilers being fed with maggot meal can perform better in terms of growth and can lead to greater feed conversion rate and reduce mortality levels (Adebiyi et al., 2021). Not only will maggot meal provide a way of dealing with protein deficits, but it can also help deal with waste as it can convert agricultural wastes into animal feed sources. Rice bran and maggot meal are two possible ingredients that may replace maize meal and fishmeal meal respectively when broilers' feed is supplemented with scent leaf extract.

Scent leaf (*Ocimum gratissimum*), a plant valued for its medicinal use, has been employed in traditional medicine and culinary purposes in different civilizations. It is a vital herb plant which has numerous benefits which can be tapped in poultry production (Okey & Egede, 2021; Nte, et. al, 2017). Some of the phytochemical compounds found in scent leaf include peptides, alkaloids, essential oils, phenols and flavanols. Studies have shown that scent leaf extract may prove useful if added to the diet of the broilers due to its antioxidant property and capacity to boost the immune system response of the animal (Ileana et al., 2021). Scent leaf inclusion in broiler feed will not only improve their health condition and growth rate but also their meat flavor (Ileana et al., 2021).

Nevertheless, there is a limited knowledge on the effects of the use of a combination of rice bran, housefly maggot meal, and scent leaf extract in broiler diets on the performance of broilers. Although each of these feeds has been independently investigated and found beneficial for broilers, their effect on growth performance and feed efficiency when used in combination is unknown (Alagawany et al., 2021). In addition, the ideal percentage of incorporation of each ingredient to ensure both economic viability and adequate nutrition is yet to be determined (Akhigbe et al., 2020). This study is based on these knowledge gaps.

Research Objectives

The main purpose of the study was to investigate growth performance and cost analysis of broiler birds' finishers fed diets of varying ratios of rice bran, housefly maggot meal and scent leaf powder. Specifically, the study determined:

1. effect of replacing maize with rice bran

at 0%, 5%, 10%, 15%; fishmeal with housefly maggot meal at 0%, 10%, 20%, 30%; supplemented with 0ml, 10ml, 20ml and 30ml scent leaf powder on the growth performance of broiler birds' finishers; and

2. cost benefits of replacing maize with rice bran at 0%, 5%, 10%, 15%, fishmeal with housefly maggot meal at 0%, 10%, 20% and 30%, supplemented with 0ml, 10ml, 20ml, 30ml scent leaf powder on broiler birds' finishers.

Hypotheses (HOs)

There is no significant difference at 0.05 level of significance in mean:

HO_1: Mean growth performance of broiler birds' finishers fed rice bran at 0%, 5%, 10%, 15%; housefly maggot meal at 0%, 10%, 20%, 30%; and supplemented with 0ml, 10ml, 20ml and 30ml scent leaf powder.

HO_2: Mean cost of rearing broiler birds' finishers fed rice bran at 0%, 5%, 10%, 15%, housefly maggot meal at 0%, 10%, 20%, 30%; supplemented with 0ml, 10ml, 20ml and 30ml scent leaf powder.

Materials and Methods

***Design of the Study*:** The study adopted a 3 x 4 factorial arrangement in a Completely Randomized Design (CRD). A factorial experiment involves simultaneously more than one factor and each factor is at two or more levels (Lawson, 2015). This design is dopted because the study involved more than one factor (treatment) and each factor had more than two levels.

***Area of the Study*:** The experiment was conducted in Agricultural Education Poultry Farm, University of Nigeria, Nsukka (UNN). The area has a high temperature with yearly minimum, mean and maximum temperatures of 24.28^{o} C, 28.24^{o} C and 32.19^{o} C respectively, and a relative humidity of 70% during the rainy season and 20% during the dry season (Ihedioha, et al., 2016). The experiment was carried out in April, 2023.

Sourcing and Preparation of Materials

Broiler Birds: A total of 220 aggritted grower 3-week broiler birds were studied. The birds were purchased from Animal Science Poultry House, UNN.

Culturing and Preparation of Housefly Maggot Meal: Prior to purchase of grower broilers, housefly maggots were produced by culturing (breeding) housefly larvae with poultry droppings. The poultry droppings attracted houseflies which later laid eggs that were hatched into larvae. The larva was fed with wheat bran until they developed into maggot. It takes 3 to 4 days for larvae to mature into maggot before they are harvested. Harvested maggots were washed, dried and milled to form maggot meal. The maggot meal was used as partial replacement for fishmeal at 0%, 10%, 20% and 30% inclusion levels for T1, T2, T3 and T4 respectively.

Sourcing of Scent Leaf and Infusion Preparation*:* Scent leaf (3kg) was purchased from Ikpa Commodity Market in Nsukka. The leaf was properly washed with clean running water without squeezing, then, air-dried at room temperature for two weeks until they become brittle. Dried leaf was milled with a hammer mill and sieved through a 2mm screen before storing it in an air-tight plastic container. To prepare the infusion, 50 grams of milled leaf was infused in 1 Litre of hot boiled water for 12 hours (overnight). The water was administered to the chicks in all the treatments with the exception of control group at varying doses of 0ml, 10ml, 20ml, and 30ml per

litre of drinking water for T1, T2, T3 and T4 respectively. Scent leaf extract was used as substitute to oxytetracycline antibiotic (a synthetic growth hormone). Control group received 0.10% oxytetracycline antibiotic growth promoter.

Sourcing of Rice Bran: Rice bran was purchased at Kingsize Feed mill located in Nsukka Urban. The rice bran was cleaned to remove impunities such as dust, stones and other contaminants. It was stream heated with live stream at 100^{o}C for 5minutes to reduce moisture content and to prevent spoilage and rancidity. The rice bran was used as partial replacement for maize in broiler feed formulation at inclusion levels of 0%, 5%, 10% and 15% for treatments T1, T2, T3 and T4 respectively.

Feed Formulation (Appendixes 1, 2): Four (4) broiler finisher feeds were formulated. The control group (T1) feed contained 0% rice bran and 0% maggot meal but contained maize and fishmeal in the correct proportion. Treatments 2, 3 and 4 (T1, T2, and T3) feeds contained rice bran at inclusion ratios of 5%, 10% and 15% and housefly maggot meal at inclusion ratios of 10%, 20% and 30% as partial replacement for maize and fishmeal respectively. Other feedstuffs that were used for formulating the feeds include maize, soybean meal, groundnut cake, wheat bran, fishmeal, bone meal, limestone, salt, vitamin premix, methionine, and lysine. After feed formulation, the feedstuffs/ingredients were purchased, milled and mixed at Kingsize Feed Mill in Nsukka, Enugu State, Nigeria. Also, the control group (T1) was supplemented with 0.10% oxytetracycline antibiotic growth promoter; while Treatments 2, 3, and 4 received scent leaf extract at inclusion levels of 10ml, 20ml and 30ml respectively and were administered via drinking water. The groups were:

(**Treatment groups, Feed formulation and Codes)**

Control Group (T1) → (0% rice bran, 0% housefly maggot meal and 0.10% oxytetracycline

Treatment 2 (T2) → 5% rice bran, 10% housefly maggot meal and 10ml scent leaf extract

Treatment 3 (T3) → 10% rice bran, 20% housefly maggot meal and 20ml scent leaf extract

Treatment 4 (T4) → 15% rice bran, 30% housefly maggot meal with 30ml scent leaf extract.

Preparations of Growers Pen: The grower's pens were properly cleaned, disinfected and allowed to dry for two days. Also, grower's drinkers and feeders were properly washed, disinfected and allowed to dry before using them. Litter materials such as wood shavings of about 5 cm to 10 cm high were spread on the floor of the grower's pen.

Treatment Procedure: Immediately on arrival, birds were randomly selected and distributed across four treatment groups. Each treatment received a total of 54 birds; and each treatment group was further replicated into three with 18 birds per replicate, thereby making it a total of 220 birds. After the distribution, the initial body weights of the birds were taken using weighing scale; and a clean drinking water mixed with anti-stress powder (Super Mibrovite) was given to the chicks. Thereafter, broiler finishers' diets formulated for each treatment and alongside clean drinking water mixed accordingly with scent leaf extract were given to the birds. The litter material was

constantly replaced and turned once the need arose.

Data Collection Instrument: The materials and instruments used to obtain data for this study were manual weighing scale and templates developed. Manual weighing scale was used to collect data on daily feed intake, body weight, and final body weight; while the templates developed were used to record the data collected. The template was designed to record the data collected on daily feed intake, body weight gain and final body weight of broiler birds.

Data Collection Techniques: Data on daily feed intake, weekly body weight gain and final body weight were collected via weighing scale. While data on feed conversion ratio (FCR) and cost benefits analysis were determined using formula (See Appendix 4, page 12). Data collection was done by the researchers. At the end of the 4th week feeding trial, the birds in each replicate were weighed to determine the average final body weights. The feeding trial last for a period of four weeks (that is, from 3 weeks to 7 weeks old).

Data Analysis: Mean and one-way Analysis of Variance (ANOVA) were used to analyse data collected. Mean was used to answer research questions while ANOVA was used to test the null hypotheses at 0.05 level of significance.

Results

Table 1: Mean and ANOVA Analysis on Growth Performance of Broiler Finishers Fed Rice Bran, Housefly Maggot Meal and Scent Leaf Extract and those Fed with Control Feed

Treatments	T1	T2	T3	T4	p-value	Remks
Av. daily feed intake (g)	130.33	134.33	135.67	133.33	0.051	NS
Av. weekly feed intake (g)	912.33	941.00	947.67	935.33	0.050	NS
Total feed consumed (g)	87398.33	91613.33	93565.00	93484.67	0.191	NS
Average FCR	2.37	2.32	2.34	2.26	0.700	NS
Av. weekly weight gain (g)	411.67	422.33	436.33	432.67	0.032	S
Av. FBW (g)	2648.33	2703.67	2734.33	2786.67	0.026	S
Grand Total					0.175	NS

Av (Average), FCR (feed conversion ratio), FBW (final body weight), g (gram), NS (not significant), S (significant), T1 (Control group), T2 (Treatment 2), T3 (Treatment 3), and T4 (Treatment 4).

Table 1 shows mean growth performance of broiler finishers throughout the 4-week feeding trial. The data revealed that T4 performed best in growth performance with the highest mean FBW of 2786.67 g and least average FCR of 2.26. While the group with poorest performance was found T1 with lowest mean FBW of 2648.33 g and highest average FCR of 2.37. The data in Table 1 further revealed that probability values for average daily feed intake (0.051), average weekly feed intake (0.050), average total feed consumed (0.191) and average FCR (0.700) were higher than 0.05 ($P > 0.05$) indicating not significant; while the p-values for average weekly weight gain (0.032) and average FBW (0.026) are lower than 0.05 ($P < 0.05$) showing significant. However, since the grand p-value of 0.175 is higher than 0.05 ($P > 0.05$), this implied that there was no significant difference in the mean growth

performance of broiler finishers fed rice bran, housefly maggot meal and scent leaf extract and those fed with control feed; hence, the null hypothesis was upheld.

Table 2: Mean and ANOVA Results on Cost Benefit Analysis of Broiler Finishers Fed Rice Bran, Housefly Maggot Meal and Scent leaf powder and Those Fed with Control Feed

Treatments	T1	T2	T3	T4	p-value	Rmks
Av. Feed Cost (₦)/Kg of Broiler	456.09	426.92	394.26	363.02	0.00	S
Av. Total Feed Cost (₦)	39,859.54	39,110.12	36,888.27	34,768.85	0.033	S
Av. Feed Cost (₦)/Kg Wt. Gain	1,079.42	989.03	921.25	809.53	0.001	S
Av. Total Cost of Production (₦)	56,259.54	55,510.14	53,288.27	51,168.85	0.033	S
Av. Total Revenue Generated (₦)	65,024.00	67,840.00	67,125.33	72,821.33	0.408	NS
Av. Net Profit (₦)	8,767.13	12,329.86	13,837.07	21,652.49	0.051	NS
Grand Total					**0.087**	**NS**

Av (Average), kg (kilogramme), Wt (weight) NS (not significant), S (significant), T1 (Control group), T2 (Treatment 2), T3 (Treatment 3), and T4 (Treatment 4).

Table 2 shows cost benefit analysis of broiler birds' fed diet containing graded levels of rice bran, housefly maggot meal and scent leaf powder (Treatment 4). This performed best in all the variables measured. T4 got the least average cost of feed per kilogram of ₦363.02, least average total feed cost of ₦34,768.85, lowest average feed cost per kilogram weight gain of ₦ 809.53, and lowest average total cost of production of ₦51,168.85. The result also showed that T4 obtained highest average total revenue generated of ₦ 72,821.33 and highest average net profit of ₦21,652.49. The data further showed that there was significant difference in the average feed cost per kg of broiler ($P < 0.05$), average total feed cost ($P < 0.05$), average feed cost (₦)/kg weight gain ($P < 0.05$) and average total cost of production ($P < 0.05$). Although, the data indicated that there was no significant difference in average total revenue generated ($P > 0.05$) and average net profit ($P > 0.05$) obtained. However, since the overall p-value of 0.087 is greater than 0.05 ($P > 0.05$) indicating that there was no significant difference in the mean cost benefit analysis of broiler finishers fed rice bran, housefly maggot meal and scent leaf powder and those fed with control feed. The null hypothesis is therefore accepted.

Discussion of Results

Findings reveal that Treatment 4 performed best in growth performance with the highest mean FBW of 2786.67g and least average FCR of 2.26, whereas the treatment with poorest performance was found Treatment 1 with lowest mean FBW of 2648.33 g and highest average FCR of 2.37 (Table 1). Also grand p-value of 0.175 was obtained and it was higher than 0.05 ($P > 0.05$), implying that there was no significant difference in the mean growth performance of broiler finishers fed rice bran, housefly maggot meal and scent leaf extract and those fed with control feed.

The results in relation to the performance in terms of growth are consistent with the results of Onabanjo et al. (2021). These researchers found out that broiler chickens which were provided with diets composed of 10% - 40% rice bran performed better in the sense that they had higher body weight gain averaging 55.33g to 47.97g. Moreover, they reached higher slaughter and carcass weights varying from 1500g to 1650g. In addition, they proved to be more efficient than the chickens in the other groups. Furthermore, results of this experiment are consistent with those of Li (2022). Which reported that broilers receiving diets which consisted of 20%-30% rice bran gained body weights significantly better compared to those receiving diets which did not contain any rice bran. Similarly, the results obtained from the current research are consistent with those of Gidado et al. (2020). Who found that the use of dietary supplements had a significantly high statistical impact ($P < 0.05$) on the final body weight of birds and total feed consumption. Furthermore, the findings are consistent with the reports of Ajiboye (2022), that broiler birds with dietary supplementation of 100% maggot meal replacement of imported fish meal had high final body weight compared with broiler birds supplemented with fish meal, with no significant difference. Maggot meal-fed birds showed a high value of crude protein digestibility of 70.68%. The findings are also consistent with those of Olobatoke &Okaragu (2021), that broiler chickens fed with scent leaf powder had the highest feed consumption rate during week 2, 3, and 4. Moreover, Okey and Egede (2021) found that broiler birds supplemented with scent leaf powder had numerically higher body weight gain and final body weight than other dietary supplementations. These outcomes corroborate the outcomes provided by Obasi (2020), who revealed that the weight gain of broiler chicks administered scent leaf powder is higher compared to that without scent leaf powder, up to a scent leaf powder addition level of 30 ml/L. The collective outcomes of a number of researchers, together with the ones of the present research, suggest that the use of scent leaf powder can improve the growth rate of broiler poultry. However, the obtained outcomes differ from those provided by Ekwe et al. (2020), where it was found that among all tested feeds, the broiler chickens, which were given the control diet, had the highest average value for ultimate body weight (1.42kg) in comparison to those which were supplied with conventional feed ingredient. The discrepancy could arise due to differences in unconventional feed ingredients used. While in the work conducted by Ekwe et al. (2020) bovine blood meal was used as an unconventional feed ingredient, the current study employed rice bran and housefly maggot meal.

Results on cost benefit analysis of broiler birds' fed diet containing ratios of rice bran, housefly maggot meal and scent leaf powder showed that Treatment 4 performed highest (Table 2). The group got the least average cost of feed per kilogram of ₦363.02, least average total feed cost of ₦34,768.85, lowest average feed cost per kilogram weight gain of ₦ 809.53, lowest average total cost of production of ₦51,168.85, highest average total revenue generated of ₦ 72,821.33, and highest average net profit of ₦21,652.49. Data also indicate overall p-value of 0.087 was recorded, which was

greater than 0.05 (P > 0.05), indicating that there was no significant difference in the mean cost benefit analysis of broiler finishers fed rice bran, housefly maggot meal and scent leaf powder and those fed with control feed. The null hypothesis is therefore accepted. The outcome of this study is in accordance with that of Onabanjo et al. (2021) who found out that birds provided with diets comprised of 10%-40% rice bran recorded low costs per kg weight gain (₦292.21 – ₦315.96) than the other groups. Along similar lines, Ekwe et al. (2020) have found that cost of feed per kg weight gain and total cost of production reduced as levels of bovine blood meal increased in the broiler diet. These results are also in conformity with the outcome of Okah and Onwujiariri (2012) that showed that inclusion of maggot meal in a bird's diet led to a decrease in the costs of diets. Furthermore, the authors observed that cost per kilogramme of live weight for birds provided with a diet comprising of 50% maggot meal was 34.22% lower than those fed on a conventional diet. This indicates that use of bovine blood meal, rice bran, and housefly maggot meal as feeds could reduce production costs. In addition, the findings of the current research are in agreement with the results of Akintunde et al. (2022). These authors showed that the cost of feed consumption (₦), cost of production (₦), and cost benefit (₦) were significantly affected (P < 0.05) by the different diets. Moreover, the results are in agreement with those found by Gadzama and Amodu (2024). These researchers showed that the utilization of maggot meal in broiler production decreases the cost of production, hence increasing the earnings of farmers. This is attributed to the fact that maggot meal is an inexpensive source of protein that minimizes the cost of feeding.

Conclusion

Results on this study show that inclusion of housefly maggot meal increased protein levels, which in turn promoted weight gain and general well-being among the birds. Furthermore, the use of a good amount of rice bran and housefly maggot meal in the broiler finishers' diet reduced the cost of feeds without compromising the growth rate of the birds. Therefore, it could be suggested that the inclusion of 15% rice bran, 30% housefly maggot meal, and 30 ml scent leaf powder would promote optimal growth among broiler finishers.

Recommendations

The following recommendations were made base on the findings of this study:

1. Broiler farmers should also include 15% rice bran and 30% housefly maggot meal as partial replacement of maize and fishmeal supplemented with 30ml scent leaf powder in broiler finisher diet for improved growth performance, and decrease in production.
2. Poultry feed manufacturers should incorporate 15% rice bran and 30% housefly maggot meal for partial replacement of maize and fishmeal respectively to broiler finisher feeds to reduce feed cost.

References

Adebiyi, O. A., Omokanye, L. O., & Adeyemo, A. I. (2021). Growth performance, nutrient digestibility and economic benefits of broilers fed different levels of housefly maggot meal. *Poultry Science Journal, 9*(2), 118-127. (https://doi.org/10.22069/psj.2021.20749.100

Akhigbe, K. I., Sanusi, A. A., & Olawale, I. R. (2020). The effects of dietary inclusion of Ocimum gratissimum on the performance

and blood parameters of broiler chickens. *Animal Production Science, 60*(9), 1087-1093. (https://doi.org/10.1071/AN19690)

Akintunde, A. R., Daniel, B., Oguntoye, M. A., Akintunde, M. O., Akinsola, O. M., Adeoye, S. O., Babalola, I.S., Istifanus, E. F., & Ardo, B. A. (2022). Nutrients digestibility and cost analysis of broiler chickens fed diets containing graded levels of brewer's dried grains with enzyme and yeast. *International Journal of Animal Science and Technology, 6*(3), 64-70

Ajiboye, K.O. (2022). Evaluation of Differently Processed Maggot (Musca domestica) Meal as a Replacement for Fishmeal in Broiler Diets. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, 7*(6): 355-363. DOI: 10.11118/actaun.2022.026 ffd504e4

Alagawany, M., Abd El-Hack, M. E., Farag, M. R., & Waseem, H. (2021). The role of alternative proteins in poultry nutrition: A review. *Poultry Science, 100*(1), 101-115. (https://doi.org/10.1016/j.psj.2020.06.008)

Bassey, N. N., Anazodo, C. C. & Onogu, B. (2023). Effects of replacing maize with rice bran on the growth performance of broiler chicks for sustainable food security. J*ournal of Centre for Technical Vocational Education, Training and Research, 5*(1), 1 – 9

Bimrew, T., Tadesse, Y., & Zegeye, B. (2020). The effect of rice bran inclusion on growth performance of broiler chickens. *African Journal of Agricultural Research, 15*(2), 150-157. (https://doi.org/10.5897/AJAR2020.14812)

Bodie, A. Micciche, A. C., Atungulu, G. G., Rothrock M. J. & Ricke, S. C. (2019). Applications and alternative food production systems. *Frontiers in Sustainable Food Systems, 3*(47), 1-14.

Ekwe, O. O., Nwali, C. C., Nwonu, S. R., Mgbabu, C. N. & Ude, I. U. (2020). The effect of graded levels of bovine blood meal on growth performance, haematology and cost benefit of broiler chickens. *Association of Deans of Agriculture in Nigeria Universities (ADAN) Journal of Agriculture 1*(1), 160-172.

Food and Agriculture Organization (2022). *FAOSTAT: Food and agriculture data.* FAO Publications.

Gadzama, I. U. & Amodu, J. T. (2024). Housefly (*Musca domestica*) larvae as protein source for livestock production: A review. *Journal of Animal Production and Resources, 8*(2), 145-156.

Gidado, A. S., Oguntoye, M. A., and Akintunde, A. R. (2020). Growth performance, nutrient digestibility and serum biochemical indices of finisher broiler chickens fed varying levels of sorghum in replacement of maize with the supplementation of exogenous enzymes. *Nigerian Journal of Animal Science, 22*(2), 81-89.

Ihedioha, J. I., Anyogu, D. C. & Chibuezeoke, K. J. (2016). Haematological profile of the domestic pigeon (*Columba livia domestica*) in Nsukka agro-ecological zone, Enugu State, Nigeria. *Animal Research International, 13*(1), 2368 – 2377.

Ileana, O., Neagu, O., & Moisoiu, A. O. (2021). The effects of *Ocimum gratissimum* (Scent Leaf) on growth and health indicators in broilers. *Journal of Medicinal Food, 24*(7), 756-762. (https://doi.org/10.1089/jmf.2020.0124)

Lawson, J. (2015). *Design and analysis of experiments with R.* United Kingdom: CRC Press, Tailor & Francis Group.

Li E. N. (2022). Effects of extrusion of rice bran on performance and phosphorous bioavailability in broiler chickens. *Journal of Animal Science and Technology,* 3(2), 201-211. https://doi.org/10.1186/s40781-015-0059-z 2b76

Lolig, V. I., Aljohani, A., & Abdel-Mageed, A. (2022). Nutritional value of rice bran and its effect on the growth performance of poultry: A review. *Journal of Animal Science and Technology, 64*(1), 1-10. (https://doi.org/10.1186/s40781-021-00339-7)

Nte, I. J., Oleforuh-Qkoleh, V. U. & Fakae, L. B. (2017). Responses of broiler chicks to scent leaf (*Ocimum gratissimum*) aqueous extracts during different stages of growth. *Delta Agriculturists, 9*(1), 105-113.

Obasi N. B. (2020). Effect of scent leaf-extract (*Ocimum grafissimum*) and neem leaf-

extract (*Azadirachta indica*) fed as antimicrobial feed additive on finishing broilers. *Nigerian Journal of Animal Science, 22*(1), 262-269.

Okah, U. & Onwujiariri, E. B. (2012). Performance of finisher broiler chickens fed maggot meal as a replacement for fish meal. *Journal of Agricultural Technology, 8*(2), 471-477.

Okey, E. A. & Egede, S. C. (2021). Comparative study of the effects of bitter leaf (*Vernonia amygdalina*), scent leaf (*Ocimum grattissimum*) and pumpkin leaf (*Telferia occidentalis*) extracts on the performance and haematological parameters of broiler birds. *International Digital Organization for scientific Research Journal ofExperimenta1 Sciences, 60,* 79-87, 20

Okosun, S. A. & Eguaoje, S. A. (2017). Growth performance, carcass response and cost benefit analysis of cockerel fed graded levels of cassava (*Manihot esculenta)* grit supplemented with moringa (*Moringa oleifera*) leaf meal. *Animal Research International, 14*(1), 2619 – 2628.

Olobatoke, R. Y. & Okaragu, B. (2021). Scent leaf (*Ocimum gratissimum*) meal improved the growth performance and lowered blood cholesterol level of cockerels. *International Journal of Veterinary Sciences and Animal Husbandry, 6*(1), 23-27

Onabanjo, R. S., Ojewola, G. S., Onunkwo, D. N., Adedokun, O. O., Ewa, E. U., Nzotta, A. O. & Safiyu, K. K. (2021). Performance of broiler chickens fed rice milling waste based diets. *Nigeria Journal of Animal Production, 48*(2), 148-161.

Prabakaran, R. (2013). *Good practices in planning and management of integrated commercial poultry production in South Asia.* Food and Agriculture Organization, Animal Production and Health Paper, 159.

Saji, K., Prakash, J., & Gupta, S. (2020). Sustainable production of housefly maggot meal and its supplementation in poultry diets. *Sustainability, 12*(8), 3245. (https://doi.org/10.3390/su12083245)

Zahir, S. (2020). Effect of replacing soybean meal with maggot meal on the production performance and egg quality traits of commercial white leg horn layers. *Journal of Dairy, Veterinary & Animal Research, 9*(6), 166-170.

APPENDICES

Appendix 1: Experimental Layout of the Study

Treatments/ Replicate	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Total
Replicate 1	18 birds	18 birds	18 birds	18 birds	
Replicate 2	18 birds	18 birds	18 birds	18 birds	
Replicate 3	18 birds	18 birds	18 birds	18 birds	216
Total	54 birds	54 birds	54 birds	54 birds	birds

Appendix 2: Compositions of Broiler Finisher's Diet

S/N	Feed Ingredients	Treatment 1 (kg)	Treatment 2 (kg)	Treatment 3 (kg)	Treatment 4 (kg)
1	Maize	41.04	39.02	36.94	34.89
2	Rice bran	-	2.02	4.10	6.15
3	Soyabean	16.46	16.46	16.46	16.46
4	PKC	6.84	6.84	6.84	6.84
5	Wheat Offal	20.52	20.52	20.52	20.52
6	BSG	2.74	2.74	2.74	2.74
7	Fishmeal	8.23	7.41	6.58	5.76

8	Housefly Maggot Meal	-	0.82	1.65	2.47
9	Bone Meal	2	2	2	2
10	Limestone	1	1	1	1
11	Vit. Min. Premix	0.25	0.25	0.25	0.25
12	Lysine	0.25	0.25	0.25	0.25
13	Methionine	0.4	0.4	0.4	0.4
14	Salt	0.25	0.25	0.25	0.25
15	Binder	0.02	0.02	0.02	0.02
	Total	100kg	100kg	100kg	100kg

Appendix 3: Proximate Analysis of Broiler Feed Finisher

Treatments	Dry Matter (%)	Crude Protein (%)	Crude Fibre (%)	Ether Extract (%)	Ash (%)	Moisture (%)
T1	90.05	20.1	3.81	3.57	6.90	9.10
T2	90.78	19.80	3.79	3.66	6.88	9.29
T3	90.66	19.30	3.87	3.70	6.89	9.05
T4	90.88	19.25	3.89	3.67	6.86	9.22

Appendix 4: Formula Used

$$\textbf{\textit{Average Feed intake/bird}}\ (\boldsymbol{g}) = \frac{\text{Quantity of feed fed} - \text{Quantity of left over feed}}{\text{Number of birds}}$$

b. $$\textbf{\textit{Feed conversion ratio}}\ (\boldsymbol{FCR}) = \frac{\text{Quantity of feed consumed}}{\text{weight gain}}$$

Average weekly weight gain (g) = average current week weight – average previous week weight.

d. $$\textbf{\textit{Feed Cost}}\ (₦)/\boldsymbol{kg} = \frac{\text{Total Cost of Feed } (₦)}{\text{Total Feed Consumed/kg}}$$

Total feed cost (TFC) (₦) = Total feed intake X cost per kg feed.

Feed cost (₦)*/Kg weight gain* = FCR X Feed Cost (₦)/kg

Total cost of production (₦) = Summation of the expenses incurred

Total revenue generated = Final body weight x number of birds' x cost per kg live weight

Net Profit = Total revenue – Total expenses.