

Effect Of Scent Leaf (*Ocimum gratissimum*) Meal Supplementation on Growth Performance and Physiological Parameters of Broiler Chickens

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Abstract

*This study was conducted to determine the effect of varying Scent leaf meal inclusion on broiler chickens' growth performance and physiological responses. A total of 90 unsexed Arbor-acre day-old broiler chicks were used for the study. After brooding, in a completely randomized design, the chicks were allotted to three treatments: A, B, and C, with thirty chicks in each. Each treatment was further subdivided into three replicates comprising ten chicks. The chicks were housed in deep litter pens, and fed Scent leaf meal (*Ocimum gratissimum*) incorporated at 0% (control), 0.4%, and 0.6%, respectively for eight weeks. The results obtained from the experiment showed respiratory rates of 68.21, 67.89, and 68.00b/min, rectal temperatures of 42.14, 41.35, and 40.15 °C, and pulse rates of 212.21, 208.33, and 200.18b/min for the treatments, respectively. Data obtained from this study on growth performance and physiological parameters were analyzed using general linear model of Minitab, 2017. Scent Leaf (*Ocimum gratissimum*) Meal Supplementation had a significant ($P < 0.05$) effect on the respiratory rate of broiler chickens. The result showed that Scent Leaf (*Ocimum gratissimum*) Meal Supplementation had no significant ($P > 0.05$) effect on broilers growth performance across all treatments; however, birds fed diets incorporated with 0.6% of SLM had a better FCR of 0.96, which led to a corresponding final weight gain of 2446.70g and the observed mortality rate was 0%. As the inclusion level of SLM increased in the diets, the growth performance parameters increased accordingly. The study recommends an inclusion level of 0.6% Scent leaf meal in the diets of broiler chickens.*

Keywords: Broiler chickens, Scent leaf meal, Growth Performance, Physiology

INTRODUCTION

Antibiotic growth promoters have been used extensively to enhance poultry growth rates and feed efficiency; however, their overuse in poultry production has led to concerns about antibiotic resistance and residues in poultry products, Hence the need for natural growth promoters (Gaggia *et al.*, 2010). There is an increasing interest in exploring natural growth promoters like medicinal herbs and plants for sustainable broiler production (Yang *et al.*, 2015). Scent leaf (*Ocimum gratissimum*), a herbaceous plant widely cultivated in tropical regions of Africa, is gaining attention as a potential alternative to antibiotic growth promoters (AGPs) in broiler chicken production. Recent studies have highlighted scent leaf's antimicrobial, antioxidant, and anti-inflammatory properties, which can positively influence broilers' growth, gut health, and physiological performance (Toghyani *et al.*, 2020). Broiler chickens are particularly sensitive to dietary and environmental changes, and their growth performance and health are crucial for the poultry industry. Olaniyi and Ojerinde (2019) reported that dietary inclusion of scent leaf extract improved weight gain and feed conversion ratio in broilers, similar to the effects achieved with AGPs. The observed improvement is attributed to bioactive compounds such as eugenol, thymol, and other phenolics, enhancing the gut microbiota balance and physiological response (Akintoye *et al.*, 2021).

Furthermore, scent leaves as a natural growth promoter align with consumer demand for antibiotic-free poultry products and support the global shift toward more natural and organic animal farming practices (Ademola *et al.*, 2022). This study aims to evaluate the efficacy of Scent Leaf as an alternative to antibiotic growth promoters in broiler poultry. By analyzing its impact on various performance and physiological parameters, we seek to determine if Scent Leaf (*Ocimum gratissimum*), can provide a viable solution to enhance broiler production without the associated risks of antibiotic use. The outcomes of this evaluation could offer significant insights into sustainable poultry management practices and contribute to the development of healthier and more environmentally friendly alternatives in broiler chicken production.

MATERIALS AND METHOD

Experimental location

The experiment was carried out at Ikot EtukUdo community located in Abak local government area of Akwa Ibom State. Abak local government area is situated in the humid tropics of South-south Nigeria. It is located along latitude 5.021°N and longitude 7.7874°E, providing a unique setting for the study. The area has an elevation of 226 feet, an annual rainfall of 3500-5000mm, and an average monthly temperature of 24⁰C-26⁰C. The relative humidity is 60-90 % (SLUS-AK, 1994).

Preparation of the Experimental Diet

The fresh *Ocimum gratissimum* leaves were harvested from surrounding gardens after which the freshly cut leaves were separated from the stem, washed with clean water to remove contaminants (dung, dirt, dust and sand), and then spread in a room to air dry properly. Well-dried leaves were

hammer-milled and sieved to achieve a fine consistency, then properly stored until usage. The experiment lasted for eight weeks, where the commercial broiler starter diet was fed for the first four weeks of the study while the commercial broiler finisher diet was used for the last four weeks. The feed provided was incorporated with scent leaf meal at 0%, 0.4%, and 0.6% inclusion level.

Housing

All proper biosecurity measures were observed as the poultry house and equipment were fumigated and disinfected using formalin and potassium permanganate. Feeders and drinkers were properly washed with clean water. Highly efficient moisture-absorbent bedding materials were provided and changed regularly. Appropriate farm wear was provided, and Foot dip was regularly changed.

Experimental Design and Management of Birds

A total of 90 unsexed Abor acre day-old broiler chicks were obtained for the study. After brooding and necessary vaccination, in a completely randomized design, the chicks were allotted to three treatments: A, B, and C with thirty chicks in each. Each treatment was further subdivided into three replicates of ten chicks. The treatments were incorporated at 0% (control), 0.4% and 0.6%, of scent leaf (*Ocimum gratissimum*). The experimental birds were housed in deep litter pens and managed with all necessary routine management and practices adhered to. Adequate feed and water were also supplied *ad-libitum*.

DATA COLLECTION

Growth Performance

The birds' initial body weights were taken at the beginning of the trial and weekly thereafter using a top-loading scale. The final body weight of each bird was taken in the 8th week of the experiment. Other growth performance parameters taken were total body weight gain, average daily weight gain (g), average daily feed intake (g), feed conversion ratio (FCR) and mortality percentage (%).

Physiological Indices evaluated include:

- a) Respiratory rate (RR): This was determined by observing the number of flank movements of the bird per minute using a stopwatch for an hour.
- b) Rectal temperature (RT): This was measured with the aid of a mini digital thermometer with $\pm 0.1^{\circ}\text{C}$ accuracy, the disinfected thermometer was inserted into the rectum of the birds for one minute using a stopwatch, and reading was taken once it beeped.
- c) Pulse rate (PR): This was determined with the aid of a stethoscope placed under the chicken's wing, with the pulse counted for one minute using a stopwatch for an hour.

Statistical Analysis

All data obtained from the experiment were statistically analyzed using the General Linear Model Procedure of the Minitab 17 software package. At the same time, significant differences between treatment means were separated using Tukey's Procedure (Minitab 17 (2000) Computer Software. Minitab, Inc., State College, PA).

RESULTS AND DISCUSSION

Table 1: Proximate Composition of Scent leaf (*Ocimum gratissimum*) Meal.

Parameter	Concentration (%)
Crude Fiber	9.81
Crude Protein	7.45
Ether Extract	3.65
Ash	4.21
Carbohydrate	55.18
Moisture	11.65
Dry Matter	8.05
Total	100

Table 1 shows the proximate composition of the Scent leaf (*Ocimum gratissimum*). The results obtained are crude fiber (9.81%), crude protein (7.45), ether extract (3.65%), ash (4.21%), carbohydrate (55.18%), moisture (11.65%), and dry matter (8.05%), respectively. However, the results obtained for Ether extract, Crude protein, fiber, carbohydrate, and water in the present study differ from those obtained by Edo *et al.*, (2023). Edo *et al.* (2023) earlier reported scent leaves as having ether extract (1.19), protein (8.48), fiber (6.89), carbohydrate (8.78), and water (73.48), respectively. Factors responsible for variations in the proximate composition reported by these authors, as opined by Olumide, *et al.*, 2018 include the time of the year it was harvested and processed. Emmanuel *et al.* (2017) suggested that scent leaf meal can be an alternative source for broilers to obtain energy requirements. This assertion is consistent with the results of the present study.

Table 2: Growth Performance of Broilers chickens fed Scent leaf (*Ocimum gratissimum*) meal.

Parameters	Scent leaf (<i>Ocimum gratissimum</i>) meal inclusion level				
	T ₁ (0)	T ₂ (0.4)	T ₃ (0.6)	SEM	P-VALUE
Final Weight Gain (g/bird)	2200.00	2263.30	2446.70	54.10	0.121
Weight Gain (g/bird)	1741.30	1890.00	1940.70	55.30	0.121
Feed intake (g/bird)	1825.30	1856.00	1856.70	79.10	0.364
Feed Conversion Ratio	0.96	1.06	0.95	0.06	0.101
Mortality Rate (%)	0	0	0	0	0

Table 2 above shows the growth performance of broiler chickens fed scent leaf (*Ocimum gratissimum*) meal. There were no significant differences among the treatment groups ($P>0.05$). However, broiler chickens fed diets supplemented with 0.6% scent leaf meal had the highest final weight gain (2446.70g/bird), followed closely by chickens fed 0% scent leaf meal and those fed (0.4%). From the results obtained from the study, it was observed that, as the rate of inclusion of scent leaf meal increased in the diet, the feed intake increased, leading to a corresponding increase in the final weight gain of the broiler chickens. The results obtained from this study further buttressed the opinion of Emmanuel *et al.* (2017), who reported that SLM has higher energy. The results obtained for growth performance agree with previous authors such as Kareem-Abraham *et al.* (2021) and Onainor *et al.* (2023), whose results show non-significant differences.

Table 3: Physiological Response of Broilers fed Scent leaf (*Ocimum gratissimum*) meal.

Parameters	Scent leaf (<i>Ocimum gratissimum</i>) meal inclusion level				
	T ₁ (0)	T ₂ (0.4)	T ₃ (0.6)	SEM	P.value
Respiratory rate (beats/min)	68.21 ^a	67.89 ^b	68.00 ^a	3.95	0.031
Rectal temperature(°C)	42.14	41.35	40.15	1.01	0.187
Pulse rate (beats/min)	212.21	208.33	200.18	2.21	0.851

^{ab} mean value in the column bearing different superscript are significantly different ($p<0.05$)

The result of the physiological response of broiler chickens fed Scent leaf (*Ocimum gratissimum*) meal is presented in Table 3 above. This experiment showed that the respiratory rate (beat/min) ranged from 67.89 to 68.21 beats/min. There were significant differences ($P<0.05$) in the results of the current study. T₁ (control) had the highest respiratory rate (69.21b/min) and 67.89b/min at 0.4% inclusion rate of *Ocimum gratissimum* leaf meal; this result corroborates with the findings of Okpe and Olaniyi (2024), who reported that *Ocimum gratissimum* leaf meal inclusion significantly affected broiler chickens' respiratory rate. The rectal temperature result obtained in broiler chickens ranged from 40.15-42.14°C. The results in the present study showed a decreasing trend in the values obtained for rectal temperature. As the percentage inclusion level of *Ocimum gratissimum* leaf meal increased in the broiler's diet, a corresponding decrease in the rectal

temperature was observed, and this could be due to the homeostatic conditions of birds during the research. The results for the pulse rate of the broiler chickens fed Scent leaf, as shown above in Table 3 showed no significant differences ($P>0.05$). However, the values ranged from 212.21-200.18b/min. This result falls within the normal reference range for pulse rate range in broiler chickens.

CONCLUSION

The study deduced that different levels of Scent leaf meal inclusion impacted the growth parameters of broiler chickens, eventually improving their physiological parameters; hence, using scent leaf meal as a natural growth promoter in improving broiler nutrition will improve their physiological status and overall performance.

RECOMMENDATION

Inclusion rate of 0.6% of Scent leaf meal is recommended in the diets of broiler chickens for increased performance and physiological response.

CONFLICT OF INTEREST

The authors declare they do not have any conflict of interest.

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