



Physiological Response of Broiler Chickens to Varying Dietary Levels of Scent Leaf (*Ocimum Gratissimum*) Meal

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Abstract

A total of ninety six (96) four-weeks old broiler chickens were used in an experiment designed to determine the physiological response of broiler chickens to varying dietary levels of scent leaf (*ocimum gratissimum*) meal. The chickens were randomly allotted to four dietary treatments with 0 %, 0.45 %, 0.75 % and 1.05 % inclusion levels of scent leaf meal designated as Treatments T1, T2, T3 and T4 respectively. Each treatment had three replicates with eight birds per replicate in a Completely Randomized Design. Physiological parameters studied were rectal temperature, respiration rate and pulse rate. Results showed that rectal temperature of the chickens ranged from 41.09°C to 41.94°C; respiration rate and pulse rate ranged from 66.91 breaths/min. to 72.41 breaths per/min. and 219.54 beats/min. to 225.00 beats/min. respectively. Results of analysis of variance showed significant treatment effect ($p < 0.05$) on respiration rate and pulse rate. Rectal temperature was not affected by treatment ($p > 0.05$). It was concluded that scent leaf meal may be included in finisher broilers' diet at 0.75 % for optimum physiological performance.

Keywords: Physiology; Chickens; Scent Leaf; Rectal Temperature; Pulse; Respiration

Introduction

Poultry is an important means in reducing the gap between demand and supply of the animal protein requirement of man. The industry occupies a unique position in livestock sector of Nigeria because poultry species are highly prolific and are good converter of feeds. Udedibie, et al. [1] suggested that, the best solution to Nigerian's protein intake particularly from animal origin is increased poultry production. Research report shows that the major factor militating against increased poultry production and/or sustainable animal production especially the monogastrics industry such as poultry, rabbits, pigs and fishes is the non-availability of feed at economically feasible price and

high incidence of disease infestation [1]. Poultry producers generally use nationally improved medication such as antibiotics, in feed or drinking water, to treat disease or to prevent disease outbreaks. Some FDA-approved medications are also approved for improved feed utilization [2].

Many types of feed additives are being used in broiler rations to improve the birds performance and resistance to diseases; with plants very commonly used as additives in broiler diets [2].

Supplementation with herbal plants could have many benefits to broiler health due to their phytochemical effects (anti-oxidative, antibiotic, antihermit etc) [3]. Dorman, et

al. [4] reported that these phytochemical effect enhances digestion by stimulating endogenous enzymes and thereby improving growth. These feed additive is applied in a broad sense, to all products other than those commonly called feedstuffs, which could be added to the ration with the purpose of obtaining some special effects [5,6].

Scent leaf (*Ocimum gratissimum*) possesses bioactive constituents which are potent against diverse bacterial species [7]. The leaves, flowers, roots, and oils demonstrated antiviral, larvicidal, bactericidal, and insect repellent properties. Oparaocha, et al. noted that scent leaf is rich in alkaloids, tannins, phytates, flavonoids, oligosaccharides, terpenoids, thymol and saponin, with a tolerable cyanogenic content. The essential oil (eugenol) present in scent leaf possesses antimicrobial activities against pathogenic strains of gram-negative and gram-positive bacteria and pathogenic fungus. Matasyoh, et al. reported lower rectal temperature when scent leaf was added in broiler chickens' diet.

The objective of this study is therefore to determine the effect of varying dietary levels of *Ocimum gratissimum* on the physiological parameters of finisher broiler chickens.

Materials and Methods

Location of the Experiment

The experiment was conducted at the Poultry unit of the Livestock Teaching and Research Farm of Prince Abubakar Audu University, Anyigba. Anyigba lies between Latitude 70 151 N and 70 211 E of the Equator and Longitude 70 111 N and 70 321 E of the Greenwich Meridian with an altitude of about 420m above Sea level. The zone is characterized by 6 -7 months of average annual rainfall of about 1600mm and the daily temperature ranges between 25°C and 35°C [8].

Collection, Processing and Preparation of the Experimental Diet

Fresh scent leaves (*Ocimum gratissimum*) were obtained from the Prince Abubakar Audu University environment. The samples were dried under the shade to retain its greenish coloration and further ground into powder using a hammer mill. The obtained powder was packed in a polyethylene bag and preserved in the feed storage room until used in fortifying the feed as additives. The result of the proximate analysis of the Scent leaf meal is shown in Table 1. Commercial feed was purchased and used throughout the experimental study. Scent leaf meal was incorporated into the feed at 0.00%, 0.45%, 0.75% and 1.05% by thoroughly mixing the feed with the phytogenic plant.

Parameter	Percentage
Moisture	18.04
Ether extract	3.08
Crude fiber	12.84
Ash	2.84
Proteins	1.14
Carbohydrate	62.06
Total	100

Table 1: Proximate composition of the Scent Leaf Meal.

Experimental Design and Management of Birds

Ninety-six (96) four weeks-old broiler chickens were used for the experiment. On the twenty-eight-day, the birds were weighed and randomly allocated to four experimental treatments in a Completely Randomized Design (CRD). Scent leaf (*Ocimum gratissimum*) meal was incorporated at 0 %, 0.45 %, 0.75 % and 1.05 % and designated as T1, T2, T3, and T4 respectively. Each treatment had twenty-four birds (24) with three replicates of eight (8) birds each. The birds were raised on deep litter system. The experiment lasted for four weeks. Feed and drinking water were provided ad libitum and standard routine management practices were observed.

Physiological Parameters

Physiological parameters of broiler chickens evaluated were:

- Rectal temperature: a digital thermometer was used in the determination of the rectal temperature of the bird by inserting it into the vent of the chicken for a period of one minute using a stop watch between 6.00am – 7.00 am
- Respiratory rate: This was carried out by counting the flank movement of the birds for one minute using a stop watch between 6.00 am – 7.00.am
- Pulse rate: This was done by the use of a stethoscope which was placed under the wing of the chicken and the pulse counted for a minute using a stop watch between 6.00 am–7.00 am

Statistical Analysis

All data collected were statistically analyzed using the one-way Analysis of Variance (ANOVA) with the aid of SPSS version 16 (SPSS, 2007). Where there were significant difference, the data were subjected to Fisher's Least Significant Difference.

Results

Physiological Response of Broilers to Varying Dietary Levels of Scent Leaf Meal

Effect of varied inclusion levels of scent leaf meal on the physiological response of Broilers is presented in Table 2. Result obtained revealed that the physiological parameters of respiration rate and pulse rate were progressively reduced across the treatments ($p > 0.05$) as the inclusion level of scent

leaf meal increased. Rectal temperature was not affected by treatments ($p > 0.05$). Values obtained for the rectal temperature ranged from 41.09 to 41.94 °C. Respiratory rate had a steady decrease with increase in the scent leaf meal inclusion levels with values ranging from 66.91 b/min to 72.41 b/min. Value range obtained for pulse rate followed a similar trend with highest value of 225.00 b/min obtained in the control and least value of 219.54 b/min obtained in the birds fed 1.05%SLM.

Parameters	Levels of Inclusion				SEM	LOS
	T1	T2	T3	T4		
	0% SLM	0.45% SLM	0.75% SLM	1.05% SLM		
Rectal Temperature (°C)	41.94	41.58	41.29	41.09	1.03	NS
Respiratory rate (b/min)	72.41 ^a	72.00 ^a	67.46 ^b	66.91 ^b	1.29	*
Pulse rate (b/min)	225.00 ^b	223.29 ^b	221.71 ^b	219.54 ^a	2.65	*

^{a,b}=means with different superscripts along the same row show significant difference at $p < 0.05$; SEM= Standard Error of the Mean; LOS = level of significance; *= Significantly different; NS=Not Significantly Different.

Table 2: Physiological response of broilers to varying dietary levels of scent leaf meal.

The physiological evaluation revealed that rectal temperature ranged from 41.09 °C to 41.94 °C. Webb P, [9] opinioned that the formation of circadian rhythm is hypothesized to be related to the difference between heat production and dissipation generated from variation of dietary treatment. This therefore implies less energy was generated with increase in *Ocimum gratissimum* leaf meal inclusion. This is in line with the report of Deeb N, et al. [10] who reported that the body temperature of a broiler cloaca is not always constant, but displays significant changes with change in nutrition, the biochemical processes as well as the climatic condition. Hashemi, et al. [11] reported that scent leaf has proven natural, less toxic, residue free pharmacological properties, resulting in a stress-free physiological state in broiler chickens. This implies that reduction in rectal temperature might not be significant except there is significant nutrition or climatic changes [12]. Anugom MI, et al. [13] reported that there was no significant difference in the feed intake and rectal temperature of experimental birds fed 1% scent leaf meal. Odoemelam KI, et al. [14] also noted no significant difference in the feed intake, rectal temperature as well as heart rate of broilers fed 0.75% inclusion level of scent leaf. Ogbu FI, et al. [15] reported rectal temperature value range of 39.80°C to 40.94°C for broilers fed scent leaf meal at 0 to 1% inclusion level. However, Okpe AA, et al. [16] reported rectal temperature value range of 39.94 to 42.60°C for broilers raised under feed restricted conditions.

Significant variation ($P < 0.05$) for respiratory rate was obtained with significant higher values of 72.14 b/min and 72.00 b/min obtained in the control and 0.45% SLM (Scent leaf Meal) inclusion level. This result implies

reduction in respiratory rate as rectal temperature decreases numerically with increasing inclusion level of scent leaf meal. This suggests that birds on 0.75% SLM and 1.05% SLM enjoyed better homeostatic condition. Values obtained for respiratory rate were in harmony with values obtained by Lin H, et al. [17] who reported respiratory rate range of 58.90 to 71.43b/min for 14 days old broilers.

Values obtained for pulse rate significantly ($P < 0.05$) decreased steadily with increase in the inclusion levels of scent leaf meal. Value of 225.00 b/min obtained in the control was within the value of 206.50 to 367.46 reported by Buyse, et al. [18] when broilers were fed diet containing varied metabolizable energy content. The significant improvements in physiological parameters of the broiler chickens with increase in the inclusion levels of scent leaf as observed in the rectal temperature, heart rate and breath rate may be due to the phytochemical properties and the mineral composition of SLM in the diets [12]. The phytochemical components such as alkaloids and saponins possess antibacterial properties, and may have acted as homeostatic regulators which promotes the improvement of the physiological parameters. Moreover, Lin H, et al. [17] had reported that there is a correlation between cloaca temperature, heart rate and breath/min and also that factors that significantly increase body temperature of the bird would alter the physiology of the animal.

Conclusion

Based on the observed results in this research work, it can be concluded that there is potential benefits of incorporating scent leaf meal into broiler chickens diet at varied inclusion

levels as they have noticeable impact on the physiological parameters of broiler chickens. The steady decreasing values obtained from rectal temperature, breath rate, and heart rate demonstrate that scent leaf meal supplementation has the potential to influence the overall physiological status of the broiler chickens. It may therefore be concluded that scent leaf meal can be considered a promising natural additive for poultry nutrition in terms of improving the physiological status thereby potentially enhancing the overall performance of broiler chickens.

Recommendations

Based on the findings of this experiment, and as the demand for sustainable and natural phytogenic plants in poultry production practices continues, the use of scent leaf meal at an inclusion level of 0.75% in broiler chicken diets is recommended for improved physiological performance.

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