

EFFECT OF DIETARY SUPPLEMENTATION WITH SCENT (*Ocimum gratissimum*) AND MINT (*Mentha piperita*) LEAF MEALS ON PERFORMANCE CHARACTERISTICS OF BROILER CHICKENS

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ABSTRACT

This study evaluated the effect of Ocimum gratissimum (scent leaf) and Mentha piperita (mint leaf) supplementation on the performance characteristics of broiler chickens. One hundred and sixty 4 weeks old Arbor-Acre broilers were randomly allotted to four treatments and four replicates of ten birds per replicate in a completely randomized design. Four experimental diets were formulated. Diet 1, which was designated as control with no leaf meal supplementation, diet 2 has 2.5g/kg Mentha piperita leaf meal (MPLM)+ 2.5g/kg Ocimum gratissimum leaf meal (OGLM), diet 3 has 5.0g/kg MPLM+ 5.0g/kg OGLM while diet 4 has 7.5g/kg MPLM + 7.5g/kg OGLM. The experiment lasted for 28 days. Growth performance parameters such as body weight, weight gain, feed intake, and feed conversion ratio (FCR) were measured. Birds fed diets supplemented with Ocimum gratissimum and Mentha piperita exhibited significantly improved final body weight, weight gain compared to the control. The best performance was observed in Treatment 2, with the final body weight of 2057.5g and FCR of 2.05. These findings suggest that dietary inclusion of Ocimum gratissimum and Mentha piperita at moderate levels can enhance broiler growth efficiency.

Keywords: *Mentha piperita*, *Ocimum gratissimum*, Broiler, Performance characteristics, Proximate composition

INTRODUCTION

Broiler production plays a crucial role in meeting global protein demands. However, the search for natural growth promoters has intensified due to the ban on antibiotic growth promoters (AGPs) in many regions (Dhama *et al.*, 2015). Phytogetic feed additives, including herbs such as *Ocimum gratissimum* and *Mentha piperita*, have gained attention for their potential to enhance growth performance and feed efficiency in broilers (Al-Mashhadani, 2015). These natural alternatives may provide antimicrobial, antioxidant, and immune-boosting benefits, improving overall health and productivity.

The antimicrobial properties of these herbs may help suppress harmful gut bacteria, leading to improved gut integrity and nutrient absorption. Previous studies have demonstrated that dietary inclusion of plant extracts can modulate the microbial population in the intestines, leading to enhanced digestive efficiency and better feed utilization (Windisch *et al.*, 2008). Additionally, phytogetic feed additives can reduce oxidative stress in birds, which is critical in optimizing immune function and overall health (Zeng *et al.*, 2015).

Table 1: Gross Composition of Basal Diet of broiler chicken (FINISHER)

Feed Ingredients	Basal Diet (kg)
Maize	62.50
Soybean Meal	30.50
Fish meal (72%)	1.50
Wheat offal	2.00
DCP	1.50
Limestone	1.00
Lysine	0.25
Methionine	0.25
Premix	0.25
Salt	0.25
Total	100
Calculated Composition	
Metabolizable Energy (kcal/KG)	3035.00
Crude Protein (%)	19.83
Crude Fat (%)	4.10
Fibre (%)	3.67
Calcium (%)	1.05
Available Phosphorus (%)	0.53
Lysine (%)	1.38
Methionine (%)	0.57

MATERIALS AND METHODS

Experimental Site and Preparation of Test Ingredients

This research was carried out at the Poultry Unit of the Federal College of Agriculture, Moor Plantation, Apata, Ibadan, situated in the humid region of southwestern Nigeria (Oyo State). The college is located at longitude 3°54'11"E and latitude 7°23'11" N, within the humid zone of South western Nigeria. The area experiences an average annual rainfall of 164 mm and an average temperature of 28.7°C (Wikipedia, 2021)

Fresh leaves of *Ocimum gratissimum* and *Mentha piperita* were obtained from the National Crops Research Institute (NCRI) in Apata, Ibadan. The leaves were shade-dried for three days before being ground into a leaf meal, which was incorporated into the experimental diets.

Chemical Composition Analysis

The proximate composition of the *Ocimum gratissimum* and *Mentha piperita* leaf meal was determined using standard procedures established by the Association of Official Analytical Chemists (AOAC, 2005). These analyses were conducted at the Biochemical Laboratory of the Institute of Agriculture and Research Training (IAR&T).

Table 2: Proximate composition of *Ocimum gratissimum* and *Mentha piperita* leaves

Parameters (%)	<i>Ocimum gratissimum</i> leaf	<i>Mentha piperita</i> leaf
Crude Protein	14.62 ± 1.31	3.12 ± 0.06
Total Ash	10.54 ± 0.81	5.75 ± 0.12
Crude Fat	2.52 ± 0.03	2.17 ± 0.04
Crude fiber	7.51 ± 0.12	6.60 ± 0.15
Carbohydrate	62.62 ± 3.23	46.32 ± 2.10
Dry matter	90.73 ± 5.50	92.5 ± 5.45

Experimental Design and Bird Management

A total of 160 four-week-old broiler chickens were randomly distributed into four dietary treatment groups in a completely randomized design (CRD), with each treatment comprising four replicates of ten birds each. Throughout the study, feed and water were provided *ad libitum*

A total of 160 four-week-old broilers were randomly allocated to four treatment groups, each with four replicates of ten birds. The diets were formulated as follows:

- T1 (Control): Basal diet without supplementation
- T2: Basal diet + 2.5g/kg *Mentha piperita* leaf meal (MPLM) + 2.5g/kg *Ocimum gratissimum* leaf meal (OGLM)
- T3: Basal diet + 5.0g/kg *Mentha piperita* leaf meal (MPLM) + 5.0g/kg *Ocimum gratissimum* leaf meal (OGLM)
- T4: Basal diet + 7.5g/kg *Mentha piperita* leaf meal (MPLM) + 7.5g/kg *Ocimum gratissimum* leaf meal (OGLM)

Performance parameters, including initial body weight, final body weight, average weight gain, feed intake and Feed Conversion Ratio were recorded. Data obtained were analyzed using ANOVA (SAS, 2012) at a significant level of $P < 0.05$. Treatment means were separated using Duncan's Multiple Range Test.

RESULTS AND DISCUSSION

Performance Characteristics of Broiler Chicken Fed Diet Supplemented on Mint Leaf and Scent Leaf Powder at Finisher Phase

Table 2 shows the performance characteristics of broiler chicken fed with mint leaves and scent leaves. The initial body weight (g/bird) of the experiment bird ranged from 520.50 to 571.00 which is not a significant difference ($P < 0.05$) from others. The final body weight of the bird in T2 (2057.50) and T3 (2023.00) was significantly higher than T1 (1900.33) and T4 (1982.67) (g/bird) respectively. The average weight gain of (T1 1434.83) and T4 (1411.67) were significantly lower ($p < 0.05$) than T2 1502.75 and T3 1500.00 which has no significant difference

The average daily weight gain (g) of T2 (53.67) and T3 (53.57) has no significant difference but is higher than T1 (51.24) and T4 (50.42) which were significantly similar to each other. The average feed intake of all the treatments was not significantly different but ranged between 3045.55 and 3141.41g. The average feed intake (g), Average daily intake (g) and feed conversion ratio (FCR) values in all the treatments were not significantly different ($p < 0.05$) from each other. Meanwhile FCR value range from T2 2.05 -2.20 and T1 has (2.20) has the highest value and average feed intake ranges from T1 (3141.41) has the lowest value while T2 has the highest value (3084.25). The result is in line with the findings of Sinha *et al.*, (2012) that mint leaf has a growth-promoting efficacy in broilers. This could be because mint leaf contain menthol enhances broiler growth rate. Nwese (2020) also recorded that scent leaf extract improved the weight gain of broilers. The results indicate significant improvements in body weight gain and FCR in birds supplemented with *Ocimum gratissimum* and *Mentha piperita*. Birds in T2 exhibited significantly higher weight gain and the FCR (2.05) though not significantly different from other treatments, suggesting that a moderate inclusion level of 2.5g/kg each of

Ocimum gratissimum and *Mentha piperita* and inclusion level of 5.0g/kg each of *Ocimum gratissimum* and *Mentha piperita* optimally enhances growth performance (Jeba *et al.*, 2011). These findings align with previous studies showing that phytogetic feed additives improve digestion and nutrient utilization (Broz and Paulus, 2015). Additionally, the bioactive compounds in these botanicals may enhance gut health by modulating the gut microbiota, improving nutrient absorption, and reducing pathogen load.

Table 3: Performance characteristics of broiler chicken fed diet supplemented with mint leaf and scent leaf powder

Parameters(g)	Basal diet (control)	Basal+2.5g/kg MPLM+ OGLM	2.5g/kg	Basal+5.0g/kg MPLM+ OGLM	5.0g/kg	Basal+7.5g/kg MPLM+ OGLM	7.5g/kg	±SEM
Initial body weight(g)	520.50	554.75		523.00		571.00		5.13
Final body weight(g)	1900.33 ^b	2057.50 ^a		2023.00 ^a		1982.67 ^b		10.60
Average weight gain(g)	1434.83 ^b	1502.75 ^a		1500.00 ^a		1411.67 ^b		9.46
Average daily weight gain(g)	51.24 ^b	53.67 ^a		53.57 ^a		50.42 ^b		1.47
Average feed intake(g)	3141.41	3084.25		3072.55		3045.55		15.23
Average daily intake(g)	112.19	110.15		109.73		108.77		2.48
FCR	2.20	2.05		2.17		2.05		0.01

^{ab} means along the same different superscripts are significantly different (p<0.05)

IW= Initial weight; FW= Final weight AWG= Average Weight Gain; AFI= Average Feed Intake

FCR= Feed Conversion Ratio

- T1 (Control): Basal diet without supplementation

- T2: Basal diet + 2.5g/kg *Mentha piperita* leaf meal (MPLM) + 2.5g/kg *Ocimum gratissimum* leaf meal (OGLM)

- T3: Basal diet + 5.0g/kg *Mentha piperita* leaf meal (MPLM) + 5.0g/kg *Ocimum gratissimum* leaf meal (OGLM)

- T4: Basal diet + 7.5g/kg *Mentha piperita* leaf meal (MPLM) + 7.5g/kg *Ocimum gratissimum* leaf meal (OGLM)

CONCLUSION

The supplementation of broiler diets with *Ocimum gratissimum* and *Mentha piperita* improved growth performance, with the best results observed at 2.5g/kg *Mentha piperita* leaf meal and 2.5 g/kg *Ocimum gratissimum* and the combination of 5.0g/kg *Mentha piperita* leaf meal and 5.0 g/kg *Ocimum gratissimum* leaf meal. These findings highlighted the potential of these botanicals as natural growth promoters. Further research is recommended to explore their impact on meat quality, immune response, and gut microbiota composition.

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