GROWTH PERFORMANCE OF BROILER CHICKS FED DIETARY SUPPLEMENTATION OF DIFFERENT PHYTOGENIC BLENDS

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ABSTRACT
This study was aimed at evaluating the growth performance of broiler chickens on dietary supplementation of phytogenic feed additives. Dietary treatment consisted of 8 groups; treatment (T) T1= Negative control (without additives), T2= Positive control (with antibiotics), T3= Blend of 35% lemon peel meal+ 30.5% orange peel meal+ 22.5% Lemongrass meal + 12% curry leaf meal, T4 = Blend of 32.5% lemon peel meal+ 33% orange peel meal+ 23.5% of Lemongrass meal + 11%of curry leaf meal, T5 = Blend of 30% lemon peel meal+ 35.5% orange peel meal+ 24.5% of Lemongrass meal + 10% curry leaf meal, T6= Blend of 27.5% lemon peel meal+ 38% orange peel meal+ 25.5% of Lemongrass meal + 9% of curry leaf meal, T7= Blend of 25% lemon peel meal+ 40.5% orange peel meal+ 26.5% of Lemongrass meal + 8% of curry leaf meal, T8= Blend of 22.5% lemon peel meal+ 43% orange peel meal+ 27.5% of Lemongrass meal + 7% of curry leaf meal. Three hundred and twenty day-old broiler chicks were randomly allotted to eight dietary treatments, each treatment had 4 replicates of 10 birds. The experiment lasted for four weeks. Data on growth performance was collected and subjected to one way analysis of variance in a completely randomised design and significant means were separated using Duncan's multiple range test at a 5% level of probability. Only the feed conversion ratio was significantly ($P<0.05$) influenced by the dietary treatment at the starter phase. The study concluded that the dietary supplementation of phytogenic blends produced a similar final weight, weight gain, and daily weight gain as the control groups.
Keywords: broiler, curry leaf, lemon grass, orange peel.

INTRODUCTION

One of Nigeria's most sophisticated agricultural industries is the rearing and processing of poultry animals (Akanni and Benson, 2014). With the growth of the human race, the output of poultry products has reached 40 million metric tons (Akanni and Benson, 2014). Relative to other types of livestock farming, the business is more appealing to investors due to its relatively brief phase of incubation, high calorie and protein content, and immediate turnover (Mokuwunye, 2000). Broilers have more nutritional needs than other farm-raised animals; hence, improved rigorous management techniques and appropriate feeding are crucial to the poultry sector.

Feed additives that can be used safely and economically to support the growth of broiler chickens and improve the nutritional quality of poultry products need to be investigated. This prompted many researchers, such as Hernadez *et al*. (2004) and Afolabi *et al*. (2016) to investigate and explore the use of herbs, spices, plant extracts, and their products as botanicals or organic supplements in animal rations.

Numerous herbal preparations, oil-derived extracts, and other phytobiotics have boosted broiler chicken productivity and had growth-promoting characteristics (Ocak *et al*., 2008; Guo *et al*., 2010).

Citrus peel, Lemongrass, and curry leaves possess all the attributes of natural growth promoters and may be used as an alternative to common artificial growth promoters like antibiotics. Curry leaf is a rich source of carbazole alkaloids, which has antioxidant, anti-oxidative, anti-microbial, and anti-inflammatory activities. (Muthumani *et al*., 2010; Priya *et al*., 2014).

The ongoing issue in poultry farming is to create management plans that maximize hen productivity while minimizing risks to consumers' health, this study evaluates the effect of dietary supplementation of different combinations of phytogenic blends (Orange peel, lemon peel, lemongrass, and curry leaf) on broiler chickens.

MATERIALS AND METHODS

Experimental site

The experiment was conducted at the Poultry Unit of the Directorate of University Farms, Federal University of Agriculture, Abeokuta (FUNAAB), Nigeria, located within latitude 70° 13'35.48" N and longitude 30° 25'39.01" E with elevation of 415 feet and altitude of 700 feet (Google Earth, 2022).

Test ingredients

Lemon peels (LP), orange peels (OP), Lemon grass (LG), and Curry leaf (CL) were the test ingredients used in this research. CL, OP and LP were purchased from the local markets within the Abeokuta metropolis, while LG was sourced from the Federal University of Agriculture Abeokuta Research Farm. The test ingredient were air-dried, milled and stored in an air-tight glass containers for subsequent use.

Experimental birds and management

A total of three hundred and twenty (320) 1-day-old unsexed Ross 308 broiler chicks were purchased from a reputable hatchery in Abeokuta, Ogun State. They were distributed after weight equalization into eight (8) treatments of 40 birds per treatment. Each treatment was further subdivided into 4 replicates of 10 birds.

Experimental diets

Basal diets were formulated for birds between 0-3 weeks old starter diet according to the National Research Council's (1994) recommendation.

Table 1: Basal composition of the experimental diets at starter and finisher phase

Ingredients %	0-3 weeks(starter)
Maize	54.20
Soya bean meal	36.50
Vegetable oil (PK oil)	2.23
Fishmeal (72% CP)	1.10
Groundnut cake	-
Bone meal	2.00
Limestone	3.00
L -Lysine HCL	0.12
DL-Methionine	0.15
Common salt (NaCl)	0.35
Premix	0.35
Total	**100.00**
Calculated analysis	
ME (Kcal/Kg)	2932.48
Crude Protein (%)	22.21
Ether extract (%)	4.65
Crude Fibre (%)	3.65
Methionine (%)	0.50
Lysine (%)	1.32

The experimental dietary treatment groups are as follows:
T1= Negative control (without additives), T2= Positive control (with antibiotics), T3= (Blend A) = 35% of LP, 30.5% of OP, 22.5% of LG, 12%g 0f CL , T4= (Blend B) = 32.5% of LP, 33% of OP, 23.5% of LG, 11% of CL
T5= (Blend C) = 30% of LP, 35.5% of OP, 24.5% of LG, 10% of CL, T6= (Blend D) = 27.5% of LP, 38% of OP, 25.5% of LG, 9% of CL, T7= (Blend E) = 25% of LP, 40.5% of OP, 26.5% of LG, 8% of CL, T8 = (Blend F) = 22.5% of LP, 43% of OP, 27.5% of LG, 7% of CL The blend formulation was based on the earlier work of Fafiolu et al (2020).

Data collection

Growth Performance Evaluation

Feed intake: A known quantity of feed was given to birds while the leftover feed was weighed to determine daily and, consequently, weekly feed intake. The feed intake was calculated by:

Feed intake (g/bird) = = weight of feed offered g– weight of leftover (g)number of birds

Weight gain: The initial weight of each animal was taken using a measuring scale at the commencement of the feeding trial. After that, weights were taken weekly till the end of the experiment to determine weight changes.

Weight gain(g) = Final weight (g) – Initial weight(g)

Feed conversion ratio: The feed conversion ratio was calculated by dividing the birds' total feed intake by the resultant weight gain

Feed conversion ratio = Feed intake gbody weight gain g

Statistical analysis

Data generated were subjected to Analysis of Variance using the General Linear Model procedure of the SAS (SAS Institute, 2007). Significantly ($p<0.05$), different means were separated using Duncan's Multiple Range Test as contained in the SAS (2010) package.

Results

Effect of different combinations of phytogenic blend on growth performance of broiler chickens (starter phase)

Table 2 shows the effects of different combinations of phytogenic blends on the growth performance of broiler chickens at the starter phase. Parameters observed were not significantly ($P>0.05$) affected except for feed conversion ratio (FCR) which was significantly ($p<0.05$) influenced and the values were similar across the most of the dietary treatment with T7 having the highest value of (1.44).

Table 2: Effect of different combinations of phytogenic blends on the growth performance of broiler chickens (starter phase)

Parameters	T1	T2	T3	T4	T5	T6	T7	T8	EM	P Value
Initial weight (g)	45.45	45.45	44.89	45.45	46..48	47.50	45.00	46.25	0.555	0.367
Final Weight (g)	696.86	723.86	704.32	702.73	707.27	732.50	701.25	681.88	20.934	0.878
WeightGain (g)	653.41	678.41	659.43	657.27	660.80	685.00	656.25	635.63	20.647	0.882
TFC (g)	997.73	932.73	10006.88	988.75	1000.0	988.75	1011.25	918.28	28.833	0.410
FCR	1.43^{a}	1.29^{b}	1.43^{a}	1.41^{ab}	1.41^{ab}	1.35^{ab}	1.44^{a}	1.35^{ab}	0.038	0.035
DWG (g/day)	31.11	32.31	31.40	31.30	31.47	32.62	31.25	30.27	0.983	0.882
DFI (g/day)	47.51	44.42	47.95	47.08	47.62	47.08	48.15	43.73	1.373	0.410

^{abc} means on the same row having different superscripts are significantly (0.05) different. SEM is the standard error of means, TFC is the total feed consumed, FCR is the feed conversion ratio, DWG is the daily weight gain, and DFI is the daily feed intake.

DISCUSSION

The growth performance of broiler chickens fed different combinations of phytogenic blends (Orange peel, lemon peel, curry leaves, and lemongrass) shows no regular statistical pattern at the starter phase. This could suggest that the content of biologically active compounds in the selected phytogenic was inadequate to cause substantial variations in the performance of broiler chickens positively or negatively. Previous studies have revealed that the response of broiler chickens to phytogenic plants is highly varied due to the differences in the phytochemical composition (Amad *et al.* 2011). It was reported by Mountzouris *et al*. (2011) that phytogenic efficiency in broilers chicken is dependent on the feed inclusion level and broiler growth phase. The non-significance in performance of broiler chickens fed diets supplemented with phytogenic blends observed in this study is partially supported by previous studies (Agu *et al*., 2010), who reported that dietary orange peel supplementation in the starter phase had no effect on the feed intake or body weight gain but had an impact on the FCR. Mmereole (2010) reported higher weight gain, better FCR, and lower mortality in broilers fed with a diet supplemented with Lemon grass. The slight variation in FCR observed in this study could be ascribed to the effect of different combinations of phytogenic blends used in this research.

CONCLUSION

Based on the result of this study, it can be concluded that inclusion of phytogenic blends in the diets of broiler chickens at the starter phase produced similar weight gain, final weight and daily weight gain compared to broiler fed antibiotics.

Recommendations

Dietary supplementation of phytogenic blends used in this can be used in broilers' diets to improve their growth performance and health status.

Further studies should be carried out using different combinations of phytogenic blends.

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