

EFFECT OF DIETARY ORGANIC ALTERNATIVES TO ANTIBIOTIC GROWTH PROMOTERS ON GROWTH PERFORMANCE OF FUNAAB ALPHA BROILER CHICKENS

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ABSTRACT

This study was conducted to determine the effect of the dietary inclusion of garlic, synbiotics, organic acidifiers and synthetic antibiotics on the growth performance of FUNAAB alpha broiler chickens. A total of 150 unsexed broiler strains of FUNAAB alpha chickens were divided into 5 treatments. Each treatment comprised of 30 birds sub-grouped into 3 replicates of 10 chicks each in a Completely Randomized Design. Birds on the Control Treatment (T₀) were fed broiler starter and finisher without any test ingredients. Treatments T₁, T₂, T₃ and T₄ birds were fed broiler starter and finisher with Garlic (3g per 1kg), Synbiotic, Organic acidifier and synthetic antibiotics (according to manufacturing directions), respectively. The data obtained were subjected to a one-way analysis of variance. The result revealed that the dietary inclusion of organic acidifier, synbiotic, and synthetic antibiotics had significant ($P < 0.05$) effects on feed intake and feed conversion ratio at starter phase. However, the test ingredients had no significant effect ($P > 0.05$) on all the growth parameters at the finisher phase. It was concluded that organic acidifier gave the best feed conversion ratio.

Keywords: Garlic Powder, Synbiotic, Organic Acidifier, Synthetic Antibiotics, Funaab Alpha Broilers

INTRODUCTION

Poultry farming is crucial for global economic growth and meeting human nutritional needs. Various strategies have been employed to maximize growth performance in broiler chickens with the aim of increasing meat availability. Antibiotics have been used extensively in poultry farming to improve growth performance and prevent disease, but their use has been restricted in many countries due to concerns about antibiotic resistance. The concern has led to the exploration of alternative strategies such as natural feed additives (Lee *et al.*, 2018; Wang *et al.*, 2019). Garlic powder, synbiotics and organic acidifiers are amongst the alternatives in use. Studies suggest that including garlic powder in poultry diets can improve growth performance, feed conversion ratio, and enhance immunity (Jalal *et al.*, 2020; Zhang *et al.*, 2017).

Synbiotics, a combination of probiotics and prebiotics, are dietary supplements for chickens, enhancing growth performance, feed efficiency, and immune function (Hamaslim, 2016). Organic acidifiers, such as formic, acetic, and propionic acid, have antibacterial properties and can reduce gut pH, creating an environment unfavorable for pathogenic bacteria (Bagal *et al.*, 2016; Sarangi *et al.*, 2016). This work aims to investigate the effects of these additives on chicken growth performance, with the ultimate goal of identifying the most effective and sustainable strategies for maximizing productivity in poultry farming.

MATERIALS AND METHODS

Experimental site

The research experiment was conducted at the Poultry Unit of IFSERAR, FUNAAB, Ogun State, Nigeria. The site, situated in the forest zone of Southwestern Nigeria, has a humid climate with an average annual precipitation of 1,330mm and temperature of 29.30C, (IFSERAR GIS Unit 2023).

Sourcing and preparation of test ingredients

Garlic powder was mixed at 3g per 1kg of feed while commercial synbiotics, organic acidifiers, and antibiotics were mixed with basal diet according to manufacturer's dose recommendation.

Experimental diet and treatment

The experiment involved 150 unsexed day-old FUNAAB alpha broiler chicks in five treatments, each with 30 birds. The birds were sub-grouped into three replicates, each having 10 birds. The final treatment, the broiler finisher, was fed with the same test ingredients at the finisher phase.

Statistical analysis

Data collected were subjected to Analysis of Variance (ANOVA) in a Completely Randomized Design (CRD) using Statistical Analysis Software (SAS 2012). Significant ($p < 0.05$) means among variables were separated using Duncan Multiple Range Test of the software.

Table 1: Ingredient composition of experimental diets for both starter and finisher phase.

INGREDIENTS	STARTER. Quantity (kg)	FINISHER. Quantity (kg)
MAIZE	58.00	53.50
SOYBEAN	29.40	20.20
FISH MEAL	1.60	0.40
GROUNDNUT CAKE	6.00	10.35
BONE MEAL	2.50	10.80
OYSTER SHELL	1.50	3.00
SALT	0.25	1.00
METHIONINE	0.25	0.25
LYSINE	0.25	0.25
PREMIX	0.25	0.25
TOTAL	100.00	100.00

RESULTS

The effect of dietary inclusion of garlic powder, synbiotic, organic acidifier and synthetic antibiotics on the growth performance of FUNAAB alpha chickens at the starter phase

Results (Table 2) show no significant influence on initial weight, final weight, weight gain, or mortality percentage. Feed intake was significantly ($p < 0.05$) reduced in organic acidifier-fed birds, while garlic inclusion led to significant ($p < 0.05$) increased feed conversion ratios.

Table 2: Effect of dietary inclusion of garlic powder, synbiotic, organic acidifier and synthetic antibiotics on growth performance of FUNAAB alpha chickens at starter phase.

Parameters	Control	Garlic	tic	Organic acidifier	Antibiotics	SEM
Initial weight (g)	96.00	90.62	96.78	92.10	95.02	1.64
Final weight (g)	699.26	712.59	741.02	728.33	745.48	15.37
Weight gain (g)	603.26	621.97	644.24	636.23	650.46	14.67
Feed intake (g)	1211.68 ^{ab}	1310.74 ^a	1160.15 ^{ab}	1059.67 ^b	1194.50 ^{ab}	34.75
FCR	2.03 ^{ab}	2.11 ^a	1.80 ^{ab}	1.68 ^b	1.83 ^{ab}	0.06
Mortality (%)	10.00	6.67	10.00	6.67	10.00	2.91

^{a, b}: Means bearing different superscripts in a row differ significantly

SEM – Standard Error of Mean

Effect of dietary inclusion of garlic powder, synbiotic, organic acidifier and synthetic antibiotics on the growth performance of FUNAAB alpha chickens at the finisher phase

The study examined the impact of garlic powder, synbiotics, organic acidifier, and synthetic antibiotics on the growth performance of FUNAAB alpha chickens at the finisher phase. Results showed no significant influence on initial weight, final weight, weight gain, feed intake, feed conversion ratio, or mortality percentage. The weight gain ranged from 997.21g to 11055.83g, feed intake from 2171.00g to 2403.18g, and feed conversion ratio from 2.17g to 2.37g.

Table 3: Effect of dietary inclusion of garlic powder, symbiotic, organic acidifier and synthetic antibiotics on growth performance of FUNAAB alpha chickens at finisher phase.

Parameters	Control	Garlic	Symbiotic	Organic acidifier	Antibiotics	SEM
Initial weight (g)	458.94	444.03	485.43	498.71	451.01	23.13
Final weight (g)	1564.76	1495.00	1540.61	1495.92	1480.71	30.89
Weight gain (g)	1105.83	1050.97	1055.18	997.21	1029.70	32.74
Feed intake (g)	2403.18	2336.75	2294.46	2171.00	2396.14	77.48
F.I PDAY (g)	114.44	111.28	109.26	103.38	114.10	3.69
FCR	2.17	2.22	2.18	2.18	2.37	0.06
Mortality (%)	10.00	6.67	10	6.67	10.00	2.91

SEM – Standard Error of Mean

DISCUSSION

The study reveals that the feed intake of FUNAAB alpha chickens is significantly influenced in the starter phase when dietary inclusion of antibiotics, synbiotics, and organic acidifiers is present. This aligns with previous research, suggesting improved feed utilization and enhanced growth performance due to inclusion of organic feed additives (Djahuri *et al.*, 2020; Syed *et al.*, 2020). The effect of garlic powder on feed intake in starter phase may be attributed to factors such as chicken preferences, environmental conditions, or individual bird health (Kairalla *et al.*, 2022). At the finisher phase, the observed feed intake of FUNAAB alpha chickens with dietary inclusions has no significance, indicating the effect of the inclusion as non-significant (Biswas *et al.*, 2019). Also at the starter phase, a significant reduction in the feed conversion ratio was observed especially with the broiler chickens on organic acidifier when compared with birds on garlic inclusion (Djahuri *et al.*, 2020; Syed *et al.*, 2020) which exhibited a high feed conversion ratio in the starter phase, indicating a less efficient feed utilization (Ibrahim *et al.*, 2022).

CONCLUSION AND RECOMMENDATION

Based on the results of this research, it can be concluded that organic acidifier enhances the feed conversion ratio of FUNAAB alpha chickens, similar to control, antibiotics and synbiotics. Garlic on the other hand, improves feed intake in FUNAAB alpha chickens.

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