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Livability and growth performance of Noiler chickens fed with different biotic additives

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***Target Audience:** Farmers, Scientists, Researchers, Students*

Abstract

Liveability and mortality rate is a germane aspect of production performance that cannot be overlooked in poultry production. The study was conducted to investigate the effect of different biotic additives (prebiotic, probiotic and synbiotic) on performance of Noiler female at the growing phase (forty-nine days) till point of first egg across the biotic additive (twenty-one days). A total of one hundred and twenty-eight female Noiler were used for the experiment. Experimental treatment consisted of prebiotic, probiotic, synbiotic and control at inclusion rate of a gram into a kilo gramme of feed. Parameters measured are: Feed intake, feed conversion ratio, weight of first egg, age of first egg and livability. Data collected were subjected to one-way analysis of variance. The result obtained revealed a better growth performance across the treatments than the control group with the least final weight. Prebiotic treatment had the best age at first lay on day one hundred and thirty-seven followed by other treatments on day one hundred and fifty-four. However, the size of the eggs was not significantly influenced by the biotic additive. Hence, the experiment can be concluded that inclusion of different biotic additives influenced the growth performance likewise Prebiotic had significant effect on the age of first laying in Noiler chicken and liveability was a hundred percentage throughout the duration of the experiment.

Key words: Noiler, prebiotic, probiotic, synbiotic, livability

Description of the problem

Disease is a major threat in poultry industry which can cause a major loss for the farmer and reduction in total income generated from the stock. Therefore, effort must be made to enhance the health status of chicken to reduce mortality. Noiler is a dual purpose breed of chicken, initiated by Amo Sieberer hatchery(1). Additives are added to Livestock diets with aims of improving performance, health of birds or the nutritive value of the diet. The threat of various infections is ever present in poultry production and is countered by the routine addition of antibiotics drugs to diets (2). Different combinations of compounds are used during the growing period in attempt to prevent diseases outbreaks. If proper measure is not considered resistance to drugs due to abused of drugs will lead to farmers income and great loss in pharmaceutical industry as well (3).

However, the use of antibiotic and antibacterial has also not been encouraged in the rearing of some types of broilers such as "Label rouge" in France (4). An alternative procedure for modifying gut microflora for enhancement of chicken health involves feeding probiotics, cultures of Lactobacilli and other bacteria that have beneficial gastro intestinal tract effects (5). Probiotics can lead to performance improvements, though not

for therapeutics use like an antibiotic. Other types of feed additives include prebiotics (oligosaccharides) and synbiotic. These can help to reduce pathogenic micro-organisms in the feed or their populations in the gastro intestinal tract and bridge the gap between livestock production and food safety. Prebiotics (Oligosaccharides) may also improve immune response (6). This study was aimed at investigate the effect of different biotic additives (prebiotic, probiotic and synbiotic) on performance of Noiler female at the growing phase till point of first egg.

Materials and methods

Experimental site

This Experiment was carried out at the poultry unit of Directorate of University farm, Federal University of Agriculture, Ogun State, Nigeria. The area is located on Latitude 7^{o} 10 N and Longitude 3^{o} 2 E. It receives a mean precipitation of 1037mm per annum an average temperature of 34.7^{0}C and an average relative humidity of 82% throughout the year (7).

Profile of test *ingredients*

Prebiotic: The prebiotic used was Manna oligosaccharides (MOS)

Probiotic: The probiotics used for this experiment was "Primilac® which contained *Enterococci faecium*, *Bacillus* species, *Bifidobacterium bifidum*, and yeast *Saccharomyces cerevisiae*.

Synbiotic: "Biotin® contain Enterococci *faecium*, *Bacillus* species, *Bifidobacterium bifidum*, and the yeast (*Saccharomyces cerevisiae)*, sea weed, and amylase.

Experimental birds and management

Prior to the arrival of the birds the poultry house was thoroughly cleaned and disinfected. The chickens were reared in battery cage. A total of one hundred and twenty-eight Noiler female point of cage (12 weeks old) were used covariantly for this experiment, from previously grown (day old to twelve weeks) three hundred and sixty Noiler breed of both sexes. These were weighed and distributed randomly into 4 treatments with 8 replicates of 4 birds each after balancing for weight. Experimental treatments consisted of (prebiotic, probiotic, synbiotic, and control) at 1g inclusion rate into kg of feed. Water was made available to the bird *ad libitum*. The birds were given medicated feed that contain prebiotic, probiotic, synbiotic and the control diet which contain no biotic additive throughout the period of the experiment. Other routine management procedures like deworming and vaccination were also carried out but no antibiotics were given throughout the period of the experiment. The experiment lasted for ten weeks

Data collection: The following data were collected

a. Feed intake: Feed intake = total feed given – feed leftover

Average feed intake (g/bird) = feed intake/number of birds in the replicate

b. Feed Conversion Ratio (FCR)

This was calculated as feed intake per kg body weight

FCR = Average feed intake (g/day) / average body weight gain (g/day)

c. Age at first lay: This is the number of days from hatch to the day the first egg was laid.

b. Body weight of hen at first lay: This was measured as weight of each live pullet averaged over the number of pullets' weight per group.

c. Weight of first egg: Weight of each first egg averaged over the number of first eggs per group were measured with the use of a balance sensitivity of 0.01g

Table 1: Percentage composition of Noiler grower diet

Ingredients	Composition %
Maize	58.00
Soybean meal	30.00
Wheat offal	5.80
Fish meal (72% CP)	1.00
Bone meal	2.50
Oyster shell	2.00
*Vitamin and Mineral premix	0.25
Lysine	0.10
Methionine	0.10
Salt (NaCl)	0.25
TOTAL	**100.00**
Calculated Analysis	
Crude protein (%)	21.25
Crude fiber (%)	4.20
Ether extracts (%)	2.21
Cal (%)	1.95
P (%)	0.70
ME (Kcal/kg)	2921.12
Determined Analysis %	
Dry matter	88.92
Crude protein	19.07
Crude fiber	3.50
Ether extract	3.47
Ash	5.56

**Premix composition per kg diet: Vit A: 400000IU, Vit D: 80000IU, Vit E: 40000ng, Vit K_3: 800mg, Vit B_1: 1000MG, Vit B_2: 6000mg, Vit B_6: 500mg, Vit B_{12}: 12.25mg, Niacin: 6000mg, Pantothenic acid: 2000mg, Folic acid: 200mg, Biotin: 8mg, Manganese:300000mg, Iron: 8000mg, Zinc: 20000mg, Cobalt: 80mg, Iodine: 400mg, Selenium: 40mg, Choline*

Table 2: Performance of female noiler chicken at growing phase (12-19 weeks)

Parameters	Prebiotic	Probiotic	Synbiotic	Control	SEM
Initial weight (g)	1274.98	1282.50	1260.00	1272.47	24.86
Final weight (g)	1818.75^{a}	1837.50^{a}	1800.00^{a}	1732.14^{b}	60.88
Total weight gain (g)	543.78^{a}	555.00^{a}	540.00^{a}	459.67^{b}	63.88
Daily weight gain (g)	11.09	11.32	11.02	9.38	1.29
Total feed intake (g)	3925.50	3967.50	3945.00	3966.43	26.27
Average daily feed intake	80.11	80.96	80.51	80.94	6.53
Feed:gain	7.32	7.18	7.30	7.16	0.80

^{a,b,c}: means in the same row not sharing common superscript are significantly different ($p<0.05$) SEM: Standard Error mean

Statistical analysis

Data collected were subjected to analysis of variance (ANOVA) using a completely randomized design as described by (8). (9) was employed in comparing differences among treatment means as contained in (10) statistical package and also descriptive statistic.

(1) Equation: Statistical Model

$\gamma_{ijk} = \mu + \beta_j + \varepsilon_{ijk}$

Where,

γ_{ijk} =Observed value of the dependent variable (output)

μ = Population mean (Overall mean)

β_j =Effect different biotic/growth promoters treatments (prebiotic, probiotic and synbiotic)

ε_{ijk} = Error term

Table 3: Performance of female Noiler chicken at point of lay to point of 1st egg

Parameters	Prebiotic	Probiotic	Synbiotic	Control	SEM
Weight at1st lay (g)	1880.00[a]	1870.00[a]	1860.00[a]	1750.00[b]	0.08
Weight of 1st egg (g)	38.81	38.02	36.53	38.01	1.17
Age at 1st laying per day	137.00[b]	154.03[a]	154.03[a]	154.05[a]	0.00
Liveability	100	100	100	100	0.00

[a,b,c]: means in the same row not sharing common superscript are significantly different ($p<0.05$) SEM: Standard Error mean

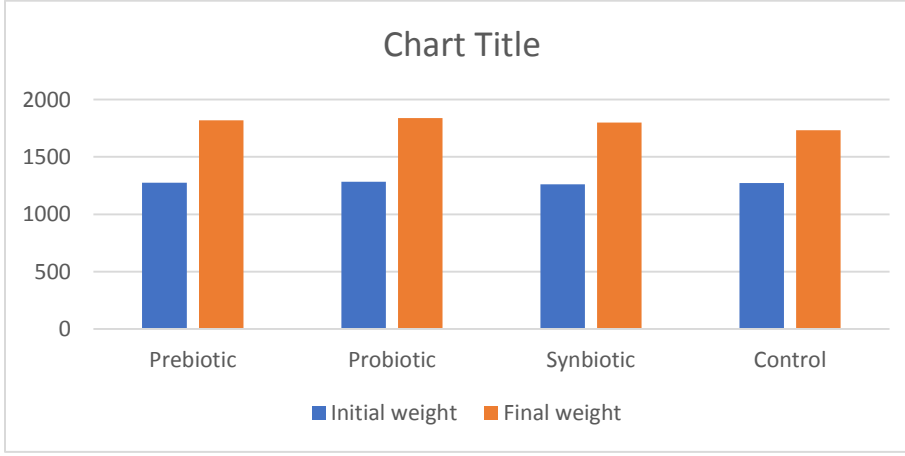

Figure 1: Weight of Noiler chickens fed with different biotic additives

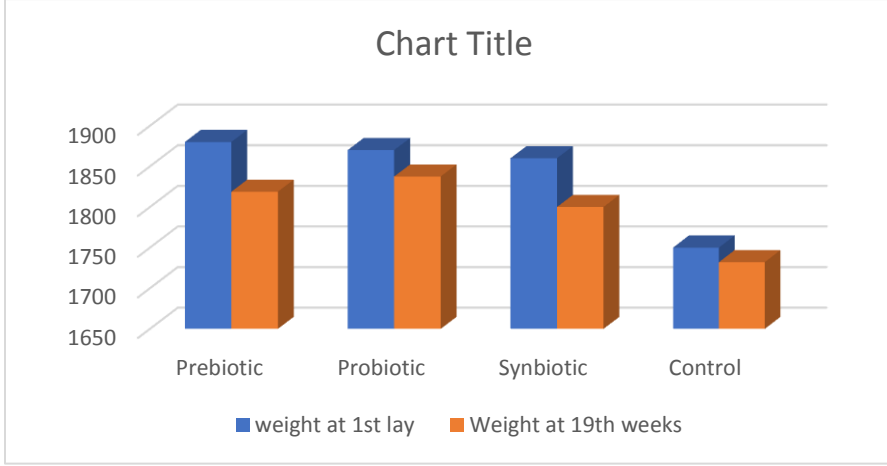

Figure 2: Weight at first lay and 19th week weight of Noiler chickens fed with different biotic additives

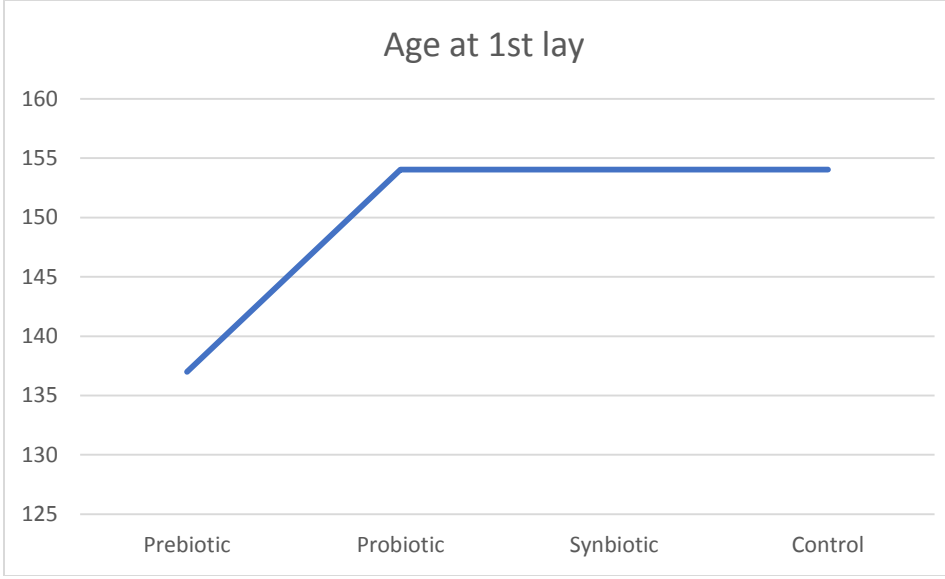

Figure 3: Age at first lay (days) of Noiler chickens fed with different biotic additives

Results and Discussion

The results of the growing performance of Noiler chicken prior to their laying period recorded different final weight. Across the dietary treatments there is significance ($P>0.05$) difference between the control treatment and other biotic treatments. The control treatment recorded the least final weight (1732.14g), total weight gain (459.67g) and gain per day (9.38) while other treatment with different biotic were significantly better and had the same performance record

However, other parameters were not significant ($P<0.05$) across the dietary treatments. (11) recommended pre laying weight of birds to be 1500-1540, the Noiler chicken of the treatment without probiotic (control) recorded the least average final weight 1732.14g as the average total weight at 19th week as shown in figure 1. The author further stated 80g for their average feed intake g/day and this correlated with feed intake of this experiment. This can be corroborated with (12) feed intake recommendation for Leghorn pullets at 20 weeks of age. However, Noiler chicken is comparatively heavier in weight than leghorn pullets, but from this result the recommendation from (12) feed intake are adequate for the breed (13) indicated that increase in weight is peculiar to all the strain studied. In addition to this study, there is correlation between body weight and sexual maturity as shown in figure 2

The author further stated that ideal body weight of point of lay should be between 1.2 to 1.3 kg. In contrast the weight of Noiler chicken at first lay deviated from the above because of their origin and their importance as dual purpose chicken as indicated in figure 2

The control treatment recorded the least average weight (1750g) across other biotic treatments. Likewise, the ages at first laying were significantly improved with prebiotic having a shorter age (137days) compared with other dietary treatment with 154days as indicated in figure 3. It has been established that use of probiotics can improve nitrogen utilization in broilers (14). Although there are limited documentation on laying

performance of Noiler chicken the performance of other laying breed. (15) reported 127.33 day for age at 1st lay in non restricted layer, in contrast 137 days were reported for the treatment that contained prebiotic biotic additive, and average of 154 days were recorded for other treatments that contained probiotic and symbiotic respectively.

Liveability and mortality rate is an important factor in poultry production as it can significantly affect the income generated from the stock (16) reported Liveability to 60 weeks as 97 % in another study by (17) a hundred percentage survivability were also recorded for Noiler breed for a period of twenty weeks during the laying phase. The previous author affirmed the survivability of Noiler chicken as reported from this study. Also, prebiotic biotic treatments had a shorter 1st egg compared to probiotic, synbiotic and the control treatment without biotic treatment. Hence, based on the findings of this experiment: it can be concluded that addition of different biotic additives affected the growth performance similarly prebiotic had effect on the age of first laying in Noiler chicken and the liveability was 100 percentage throughout the period of the experiment.

Conclusion and Applications

The study established that:

1. The inclusion of different biotic additives improves the growth performance of Noiler chicken. As the study emphasizes the importance of biotic additives as a method to improve the performance of Noiler chickens in poultry production.
2. From the result of this experiment, prebiotic biotic treatment showed the most significant effect on the age of first laying with 137 days as compared to other biotic treatments.
3. The Liveability rate for Noiler with and without the use of an antibiotics throughout the period of the experiment was a prove that under ideal management practise Noiler chicken are tolerant with one hundred percent survivability.

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