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Original Research Article

Effects of Feeding Varying Concentrations of Bactofort® Probiotics on Growth Performance in Broiler Chickens

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Abstract

This study was designed to determine the effect of feeding varying concentration of probiotics on growth performance in broiler chickens. A total of 81 day-old broiler chicks were used for this experiment, they were divided into three groups of 27 chicks each (n=27). Group A: No probiotics was administered and served as the control, Group B: birds were administered probiotics in feed at an inclusion rate of 0.5g/kg of feed, Group C: birds were administered probiotics in feed at an inclusion rate of 1g/kg of feed. Weekly weight gain and feed conversion ratio of each group of chickens was recorded for the six weeks experimental period. There was statistical significant difference ($P \leq 0.05$) in the weight gain and feed conversion ratio between the two experimental groups of birds (Groups B and C) fed probiotics and Group A (control) from the forth week to the end of the experiment. Groups B and C chickens had higher live weight and lower feed conversion ratio than group A chickens at the end of the experiment. However, there was no statistical significant difference ($P \geq 0.05$) in both the live weight and feed conversion ratio between groups B and C, fed different concentrations of probiotics. In conclusion, the use of probiotics supplemented in feed resulted in a significant increase in live weight and a lower feed conversion ratio in broiler chickens. It was therefore recommended that broiler chickens should be administered probiotics to help in weight gain and invariably maximize profit.

Keywords: Bactofort®, Broiler chickens, Feed conversion ratio, Live weight, Probiotics.

INTRODUCTION

Feed additives were generally used to improve feed intake in broilers and to act as growth promoters [1]. The use of probiotic bacteria has become increasingly popular for improved nutrition [2-4]. Probiotics are live micro-organism that affects the host animal by improving its intestinal balance, promoting health and preventing diseases [5]. It can also be defined as a single or mixture culture of live micro-organism which when applied to animals, affect the host beneficially by improving the properties of indigenous micro flora [6].

The poultry sector is believed to contribute up to 25% of the agricultural gross domestic products of the Nigeria economy and currently Nigeria is rated as the leading country in Africa in commercial egg production and the fourth in broiler production [7]. Unfortunately, many farmers face different challenges mainly due to the high cost of feed and other inputs. Furthermore, many feed raw materials used in the formulation of feeds contains anti-nutritive factors which may inhibit the optimal growth of the birds especially broilers chickens and invariable affect profit [8, 9].

In an attempt to improve production and maximize profit, so many farmers resort to alternative source of inputs such as antibiotics and other synthetic growth promoters which poses great danger on public health. Probiotics have been used as an alternative to antibiotics in animals and humans; their efficiency in animals has been widely discussed [2, 3].

Multi-specie probiotic preparations are thought to be more effective than single-strain probiotics. However, there is paucity of information on the efficacy of feeding varying concentration of the same probiotics on growth performance of broiler chickens. We hypothesized that feeding varying concentrations of probiotics to broiler chicken diets have effects on growth performance.

This study was therefore performed to determine the effect of feeding varying concentration of probiotics (Bactofort®) on weight gain and feed conversion ratio in broiler chickens.

MATERIALS AND METHOD

This study was carried out at the Livestock Investigation Division of the National Veterinary Research Institute, Vom, Plateau State, Nigeria. The State is located in the North Central Geopolitical zone of Nigeria [10].

A total of 81, day-old Abor-acre broiler chicks with an average weight of 35grams were used for this experiment. They were randomly divided into three groups of 27 chicks each and housed in a clean pen. Brooding paper was placed on the floor for the first two weeks and then wood shaving for the rest of the experimental period. Chicks in all groups were fed with broiler starter feed for the first four weeks, and broiler finisher feed from four weeks to the end of the experiment ad-libitum. The birds were vaccinated against Infectious Bursal disease using ABIC® Gumboro live vaccine on days 8 and 21 and Newcastle disease by ABIC® live Lasota vaccine on days 14 and 28.

Bactofort® probiotics was used, it is a mixture of feed additive obtained from the combination of dried yeast culture and dried bacterial fermentation products and extracts, containing *Lactobacillus acidophilus* 77 × 10^9 CFU/Kg, *Enterococcus faecium* 44 × 10^9 CFU/kg, *Bacillus subtilis* 2.2 × 10^9 CFU/kg, manufactured by Biofeeds technology Inc Brossand, QC, Canada.

A Completely Randomized Design (CRD) was used. The broiler chicks were divided randomly into three groups of 27 birds each. Group A, B and C.

- Group A: Birds were fed with commercial feeds only and served as the control.
- Group B: Birds were administered probiotics in feed at inclusion rate of 0.5g/kg
- Group C: Birds were administered probiotics in feed at inclusion rate of 1g/kg

During the experimental period the body weight of the birds were taken weekly using digital weighing scale, feed intake was determined and recorded at the same time. Feed intake per group was calculated as the difference between the amount of feed given to the birds and the left over at the end of every day. Body weight was calculated as the difference between the final and initial birth weight each week. Feed conversion ratio (FCR), was calculated as the ratio between feed intake and weight gained at the end of each week.

All data obtained were expressed as mean and presented in tables. One way ANOVA with Turkey's Post-hoc Test using SPSS Version 20 for windows was used to determine any significant difference in the body weight and feed conversion ratio among the three groups of birds. Values of $P<0.05$ were considered significant.

Table-1: Composition of Broiler Feed

Basal diet	Composition (%)
Nutrient composition	
Crude protein	22
Fat/oil	6
Crude fibre	5
Calcium	1
Available phosphorus	0.45
Lysine	1.20
Methionine	0.30
Salt	
Metabolizable energy (Kcal/kg)	2900

RESULT

The average initial and weekly body weight gain of all the experimental group of birds is presented in Table-2.

There was no statistical significance difference in the body weight gain among the three experimental groups of birds in the first four weeks ($P\leq 0.05$). However, there was statistical significance difference in the fifth and sixth week ($P\leq 0.05$) (Table-2). The body weight gain of broiler chickens in group B and C was significantly higher than those in group A (control) ($P\leq 0.05$).

Table-2: Average initial and weekly weight gain (g) of the three experimental groups

Day	Group A	Group B	Group C
0	35^a	35^a	35^a
7	119.61^a	123.7^a	122^a
14	306.8^a	342.3^a	287.7^a
21	582^a	604^a	550^a
28	971^a	1079^b	1007^b
35	1524.8^a	1710^b	1650.7^b
42	2023.6^a	2205.5^b	2194.6^b
^{a,b} Row means with different superscript differ significantly at P <0.05". A: Control; B: birds fed probiotics at 0.5g/kg; C: birds fed probiotics at 1g/kg			

Similarly, there was statistical significance difference in the feed conversion ratio ($P<0.05$) between the experimental groups (Group B and C) and the control (Group A) (Table-3). The birds in groups B and C had lower feed conversion ration than those in group A (control).

However, there was no statistical significant difference in the feed conversion ratio between Group B and C ($P>0.05$) as shown in Table-3.

Table-3: Feed conversion ratio of the three experimental groups (FCR)

Groups	Total feed consumed (g)	Total weight gain (g)	FCR
A	4013.2	1988.6	2.01[a]
B	3971.6	2170.5	1.82[b]
C	3925	2159.6	1.81[b]

[a,b] column means with different superscript differ significantly at $P<0.05$"
A: Control; B: birds fed probiotics at 0.5g/kg; C: birds fed probiotics at 1g/kg

DISCUSSION

It can be inferred from various studies that supplementation of probiotics to broiler chicken diet improved body weight gain and performance [2-4]. Probiotics are live non-pathogenic and non toxic micro-organisms which when administered in adequate amount, confers health benefit to the host [7] When broilers were fed LAB at 200g/400kg of feed by Krecov & Puijic [11], they observed that total body weight gain in birds fed with and without LAB were 1570 and 1545g, respectively. Furthermore, according to Ignatova *et al.,* [12], the administration of probiotic positively affected body weight gain ($p<0.001$), feed intake and feed conversion rate by 7.7% and 8.1% respectively. Musa *et al.,* [3] documented that probiotics treated group of broiler chicken came second after *moringa olifera* treated groups in terms of body weight gain and feed conversion ratio. Several mechanisms have been proposed to explain the beneficial effect of probiotics such as; competitive exclusion [13], production of inhibitory substances such as organic acids, hydrogen peroxide and bacteriocin [13].

The body weight increase observed in this experiment between the experimental broiler chickens (groups B and C) and the control (group A) from the fourth week of the experiment, could be as a result of the probiotics (Bactofort®) administered in the feed. Perhaps, the mixture of probiotic strains administered to the experimental birds produced inhibitory substances such as bacteriocin, which inhibited the growth of other pathogenic micro-organism thereby facilitating the uptake and utilization of all the available nutrients in the gut of the birds. It could also be that the mixture of probiotics administered created a favourable micro flora in the gut of the birds through competitive exclusion such as competition for adhesion site and nutrient with pathogenic microorganism thereby enhancing the uptake and utilization of available nutrients and invariably improving live weight and feed conversion ratio of the birds as suggested by studies done by Nilson *et al* [14].

However, there was no statistical significant difference in the weight gain and feed conversion ratio between the two experimental groups (B and C) fed varying concentration of probiotics. Perhaps, the levels of inclusion of the probiotics were not high enough to produce any significant difference between the two groups.

These findings are similar to works done by Aluwong *et al.,* [15] and Chen *et al.,* [16] who also reported positive effect of probiotics on growth performance of broiler chickens. Aluwong *et al.,* [15] reported positive effect of probiotics from the fourth week of experimental supplementation of probiotics to broiler chickens.

CONCLUSION

The administration of Bactofort® probiotics at an inclusion rate of 0.5g/kg and 1g/kg significantly improved the live weight of broiler chickens and better feed conversion ratio of the experimental birds compared to the control, but there was no statistically significant difference observed between the two experimental groups fed varying concentrations of Bactofort® probiotics.

It was therefore recommended that probiotics (Bactofort®) should be added to broiler feed to enhance growth performance.

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