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PERFORMANCE AND CARCASS TRAITS OF BROILERS SUPPLEMENTED WITH PROBIOTIC OR NEOMYCIN ANTIBIOTIC

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SUMMARY

An experiment was conducted designed to evaluate the effect of a probiotic as alternative to antibiotic growth promoters for broiler chicks. One hundred and fifty unsexed one-day-old Ross broiler chicks were randomly assigned to five equal groups; the first was considered the control group, while the second to fifth was the treatments groups. Each group included three equal replicates each of 20 chicks. The ration used in the first group was the experimental ration without any supplements (control) while, those of 2-5 treatment groups were the same ration, but supplemented with antibiotic Neomycin (200 mg/kg diet), probiotic (1g/kg diet), probiotic (1.5g/kg diet), and probiotic (2g/kg diet), respectively. All birds were raised in wire floored batteries with the following dimensions: width: 97 cm; length: 50 cm; height: 45 cm under similar environmental and management conditions. Body weight (BW), body weight gain (BWG), feed intake (FI), feed conversion ratio (FCR); carcass and some organ weights percentages as well as intestines and ceca lengths were determined at the end of the experiment (42 days of age). The obtained results revealed that birds fed ration supplemented with antibiotic (G2), achieved significantly heavier final BW and higher BWG than birds received different levels of probiotic (G3 to G5) or the control diet (G1). However, birds received 1g or 1.5g probiotic/kg diets (G3 or G4) had significantly higher final BW and BWG than those fed the probiotic diet (G5) and the control diet (G1). Birds fed antibiotic diet (G2) or received 1g and 1.5 g probiotic/kg diets (G3 and G4) had significantly better FCR values than those of birds fed the control diet (G1) and 2g probiotic/kg diet (G5). The total mortality rate of birds in G3 was lower than those of the other groups. Supplementing the diets with antibiotic or probiotics did not affect the percentages of carcass and body organ weights (gizzard, liver, heart, spleen and Giblets) as well as the lengths of intestines and ceca. The abdominal fat percentage in G1 and G4 was decreased compared to the other groups. Therefore, the supplementation of 1.5 g probiotic/kg diet as an alternative to antibiotics in broiler diet is highly recommended to obtain higher growth performance, improved feed conversion, and lower mortality, without adverse effect on abdominal fat and carcass traits.

Keywords: Probiotic, antibiotic, broilers, performance, carcass

INTRODUCTION

Antibiotics have been used in animal agriculture after their discovery in the 1950's (Fuller, 1989). Dietary antibiotics are reported to have beneficial effects on animal and poultry growth, feed conversion efficiency and the inhibition of pathogen growth (Gaskins *et al.*, 2002). However, the extensive use of antibiotics caused an antibiotic residue problem in poultry meat and increased proportion and persistence of antibiotic resistant fecal bacteria (Fuller, 1989; Turnidge, 2004).

Many research studies have reported feed residues in chicken meat products and development of bacterial resistance to antibiotics used in both human medicine and poultry production. Therefore, since January 2006, European Union banded the trade and use of antibiotics in food producing animals, and escalated the search for alternatives to be used within the poultry industry (Janardhana *et al.*, 2009). In this respect, Gibson and Roberfroid (1995) stated that the use of compounds that may have probiotic effects is a possible way to improve intestinal health and animal performance in the absence of antibiotic growth promoters.

Probiotics are live microbial feed supplements, which improve the intestinal microbalance (Jernigan and Miles, 1985). Probiotics are multi-strain compounds containing live microbes to establish, enhance or re-establish essential microflora in the gut. Probiotics are a highly concentrated pre-mix containing seven strains of bacteria (*Lactobacillus planetarium*, *Lactobacillus bulgaricus*, *Lactobacillus acidophilus*, *Lactobacillus rhamnosus*, *Bifidobacterium bifidum*, *Streptococcus thermophilus*, and *Enterococcus faecium*). All micro-organisms in the probiotics are naturally occurring and have been isolated from a wide range of feed, plant, animal, bird and human sources. Moreover, probiotic is reported to be safe, non-toxic and residual free.

According to International Animal Health (1999), there were no risks due to overdosing since the probiotic is compatible with all feeds, feed ingredients like vitamins and minerals and some antibiotics. Cyberhorse (1999), stated that probiotic can be used in a wide range of circumstances, to improve the general health of animals, address specific problems and maximize animal's performance. The authors added that under general conditions, probiotic has been promoted to: improve health naturally, stimulate appetite, aid in establishment of gut flora in immature animals like one day old chicks, re-establish gut microflora after antibiotic treatment, optimize digestion of feed and reduce stress. Many studies on the efficacy of probiotics on animal growth and performance revealed positive (Correa *et al.,* 2003) and none or negative effects (Lima *et al.,* 2003). The present study aimed to evaluate broilers performance using under different levels of probiotic in order to find out the most suitable ones and their possibility as alternatives to antibiotics in broiler production.

MATERIALS AND METHODS

Experimental Birds:

One hundred and fifty unsexed one-day-old Ross broiler chicks were wing banded, individually weighed and randomly distributed into 5 equal groups, (control and 4 treatments). Each group included three replicates of 10 chicks each.

Experimental groups:

The first group (G1) was fed commercial broiler diet without supplementation (control), while the second, to fifth groups (G2 to G5) were the treatments groups, in which birds were fed diets containing 200 mg Neomycin/kg diet, 1 g probiotic /kg diet, 1.5 g probiotic /kg diet, and 2 g probiotic /kg diet, respectively.

Management:

The birds were raised in battery cages with the dimensions: width: 97 cm; length: 50 cm; height: 45 cm in a closed broiler house under standard management trial conditions. Chicks were exposed to 24 continuous lighting hours by using incandescent lambs, 60 watt hanged at a level of 180 cm from the floor. Feed and water were available ad libitum all the time. Light intensity was gradually reduced to be around 10 LUX by 21 days of age. The relative humidity was kept at 50-60%. Thermo neutral temperatures were maintained throughout the experiment. They were 32°C for d 1 to 3, 30°C for d 4 to 6, 28°C for d 7 to 10, 26°C for d 11 to 14, 24°C for 15 to 21 d and 22°C thereafter. All Chicks were vaccinated for Newcastle disease at 7, 18 and 28 d and Gumboro disease at 12 d. Birds were fed a starter diet from 1 to 21 d and a grower diet from 22 to 42. The composition and calculated analysis of the experimental diets are shown in Table (1).

Table 1. Composition and calculated analysis of experimental broiler diets

Items	Starter diet (0-3 wks)					Grower diet (4-6 wks)				
	G1	G2	G3	G4	G5	G1	G2	G3	G4	G5
Ingredients (%)										
Yellow corn	62.00	61.98	61.90	61.85	61.80	67.00	66.98	66.90	66.85	66.80
Soybean meal (44% CP)	27.80	27.80	27.80	27.80	27.80	20.00	20.00	20.00	20.00	20.00
Corn gluten meal (60%CP)	6.32	6.32	6.32	6.32	6.32	8.30	8.30	8.30	8.30	8.30
Dicalcium Phosphate	1.90	1.90	1.90	1.90	1.90	1.93	1.93	1.93	1.93	1.93
Limestone	1.29	1.29	1.29	1.29	1.29	1.34	1.34	1.34	1.34	1.34
Sodium chloride	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
DL-Methionine	0.14	0.14	0.14	0.14	0.14	0.23	0.23	0.23	0.23	0.23
L-Lysine	0.19	0.19	0.19	0.19	0.19	0.48	0.48	0.48	0.48	0.48
Vit. & Min. Premix[1]	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Sand	0.01	0.01	0.01	0.01	0.01	0.37	0.37	0.37	0.37	0.37
Probiotic[2]	0.00	0.00	0.10	0.15	0.20	0.00	0.00	0.10	0.15	0.20
Antibiotic[3]	0.00	0.02	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
Calculated Analysis[4]										
ME (kcal/ kg diet)	3000	3000	3000	3000	3000	3152	3152	3152	3152	3152
Crude protein (%)	23	23	23	23	23	21	21	21	21	21
Calcium (%)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Available phosphorus (%)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Lysine (%)	1.16	1.16	1.16	1.16	1.16	1.28	1.28	1.28	1.28	1.28
Methionine (%)	0.52	0.52	0.52	0.52	0.52	0.59	0.59	0.59	0.59	0.59

G1 to G5: Control, 200 mg Neomycin/kg diet, 1g probiotic/kg diet, 1.5g probiotic/kg diet, 2g probiotic/kg diet, respectively.
[1]Provided per kilogram of diet: vitamin A, 5500 IU; vitamin E, 11 IU; vitamin D3, 1100 IU; vitamin B_2, 4.4 mg; ca pantothenate, 12 mg; nicotinic acid, 44 mg; choline chloride, 191 mg; vitamin B_{12}, 12.1 µg; vitamin B_6, 2.2 mg; thiamine (as thiamine mononitrate), 2.2 mg; folic acid, 0.55 mg; d- biotin, 0.11 mg; Mn, 60 mg; Zn, 50 mg; Fe, 30 mg; Cu, 5 mg; Se, 0.3 mg. [2]Prebiotic provided per gram: *Lactobacillus planetarium*, 1.26 x10^8 CFU; *Lactobacillus bulgaricus*, 2.06 x10^8 CFU; *Lactobacillus acidophilus*, 2.06 x10^8 CFU; *Lactobacillus rhamnosus*, 2.06 x10^8 CFU; *Bifidobacterium bifidum*, 2.00 x10^8 CFU; *Streptococcus thermophilus*, 4.10 x10^8 CFU; *Enterococcus faecium*, 6.46 x10^8 CFU. [3]Antibiotics (200 mg Neomycin /kg diet).[4]According to NRC (1994).

Parameters studied criteria:

Birds of each replicate were biweekly weighed on individual basis and the body weight gain (BWG) was calculated as the difference between final and the initial body weight. Feed intake (FI) for each replicate was calculated weekly as the difference between the amount of offered feed and its remaining. The amount of consumed feed per bird was adjusted by taking in consideration the dead birds. The mean feed conversion ratio (FCR) was biweekly calculated by dividing total feed consumed by the total body weight gain of birds per each replicate. Numbers of dead bird were recorded daily and the mortality rate was calculated for each treatment. The following performance parameters were measured: feed intake (FI), weight gain (WG), and feed conversion ratio (FCR) for the cumulative periods of 1- 14, 15-28, 29 – 42 and 1-42 days of age.

At the end of the experimental period (42 days of age), nine birds per group (three birds around the average weight of each replicate) were fasted for 8 hours and slaughtered. After complete bleeding, the birds were scalded and feathers were mechanically plucked. The internal organs (heart, liver, empty gizzard and spleen) were removed and weighed. Also, intestines and Ceca were lengthened. Carcass weights including giblets were calculated as percentage of pre-slaughter live body weight, while body organs (heart, liver, gizzard, giblets and spleen) were calculated as percentages of carcass weight. The abdominal fat was removed, weighed and calculated as percentage of carcass weight.

Statistical analysis:

Data were statistically analyzed by ANOVA using the General Linear Model (GLM) Procedure of SAS software (SAS institute, version 9.1, 2005). Duncan's multiple range test (Duncan, 1955) was used to detect differences among means of different groups. The following model was fitted: $Y_{ij} = \mu + T_i + R_j + eij$. Where: Y_{ij} = observed value of the concerned treatment. μ = observed mean for the concerned treatment. T_i = effect due to treatment. R_j = the effect due to replicate. E_{ij}= the error related to individual observation.

RESULTS AND DISCUSSION

Body weight:

Data on body weight (BW) are presented in Table (2). At 2nd week, birds of the control, (G1) achieved significantly higher BW than those of G2 and G4, while there were no significant differences ($P \leq 0.05$) between groups 1, 3 and 5. At 4th week, birds of G3 had significantly heavier BW than those of groups 1, 2, 4 and 5. At 42 days of age, birds fed antibiotic (G2) are superior compared to the other treatments and the control one. However, birds fed diets supplemented with 1 or 1.5g probiotic/kg diet (G3 or G4) had significantly heavier final BW than those fed probiotic diet (G5) and the control diet (G1). Many researchers reported that dietary antibiotics associated with improved poultry growth and inhibited growth of pathogens (Gaskins *et al.,* 2002; Jalaludeen *et al.,* 2005 and Sun *et al.,* 2005).

Table 2. Live body weight (g) and total mortality rate (TMR) as affected by dietary Neomycin antibiotic and different levels of probiotics

Treatment Age	G1	G2	G3	G4	G5	Significance level
Day old	45.2±0.4	45.0±0.7	45.7±0.7	44.5±0.6	46.0±0.3	0.4552
2nd weeks	562.0^{a}±1.2	523.8^{c}±7.0	552.2^{ab}±5.6	523.2^{c}±1.7	536. 0^{ab}±8.9	0.0024
4th weeks	1430.3^{b}±6.1	1405.2^{c}±1.5	1483.3^{a}±1. 7	1436.7^{b}±3.3	1381.7^{d}±5.8	0.0001
6th weeks	2396.1^{c}±2.0	2501.7^{a}±1.2	2461.7^{b}±19.8	2446.7^{b}±14.8	2363.9^{c}±8.7	0.0001
TMR (%)	2.20	1.10	1.10	0.00	1.10	

$^{a----d}$ Means (±SE) in the same row with different superscripts are significantly different ($P \leq 0.05$).
Values in each row are means for 3 replicates of each treatment (30 birds per each).
G1 to G5: Control, 200 mg Neomycin/kg diet, 1g probiotic/kg diet, 1.5g probiotic/kg diet, 2g probiotic/kg diet, respectively.

Regarding the effect of probiotics, Ignatova *et al.* (2009) found a significant improvement in BW due to the use of probiotics in broilers. Jalaludeen *et al.* (2005) reported that the 0.025% probiotic supplemented birds had a significantly heavier body weight and weight gain. Inconsistent results have been reported in some literature for the effects of probiotics on broiler growth performance. EL-Nagmy *et al.* (2007) found the positive effects for the probiotics since they improved the absorption of nutrients and increased significantly the broiler body weight as well as depressed the harmful bacteria that cause the growth depression. Numerous studies showed that probiotics have positive effects on chicken performance (Maiolino *et al.,* 1992 and Mountzouris *et al.,* 2007). However, others (Yang *et al.,* 2008) did not find such positive effects.

Body weight gain

Data of body weight gain (BWG) are presented in Table 3. During 0-2 weeks of age, the birds of G1 and G3 had significantly heavier BWG than those in G2 and G4, while there were no significant differences ($P \leq 0.05$) between groups 1, 3 and 5. During 3-4 weeks of age, the birds of G3 achieved significantly higher BWG than those in the other groups (G1, G2, G4 and G5). During 5-6 and 0-6 weeks of age, birds fed antibiotic (G2) had significantly higher BWG than those fed different levels of probiotic diets (G2 to G5) or the control diet (G1). However, birds fed 1g or 1.5g probiotic/kg diets (G3 or G4) had significantly higher BWG than those fed probiotic (G5) and control diets (G1), during 0-6 weeks of age. This is in agreement with the findings of Contrearas-Castillo *et al.* (2008), who stated that supplementation of antibiotic to the feed, resulted in significantly higher BWG (1-40 days) than those of the other treatments (1g probiotic/kg, 0.5g probiotic/kg, and 0.05g probiotic/kg and control diets). Islam *et al.* (2004) found that the supplementation of 2g probiotic/10 liters of drinking water led to higher (P≤0.05) BWG of broiler in all treatments as compared to the treatment with 1g and 3g probiotics/10 liters of drinking water as well as the control diet. In contrast, the results are oppositely to those of Correa *et al.* (2003).

Table 3. Daily body weight gain (g/bird) as affected by dietary Neomycin antibiotic and different levels of probiotics.

Treatment Age	G1	G2	G3	G4	G5	Significance level
0 -2 weeks	36.9^{a}±0.7	34.2^{c}±0.6	36.2^{a}±0.3	34.2^{c}±0.8	35.0^{ab}±0.9	0.0085
3-4 weeks	62.0^{cd}±0.1	63.0^{c}±0.5	66.5^{a}±0.6	65.3^{b}±0.6	60.4^{d} ±0.3	0.0055
5-6 weeks	69.0^{d}±0.9	78.3^{a}±0.7	69.9^{cd}±0.7	72.1^{b}±0.9	70.2^{c}±0.6	0.0055
Overall mean	56.0^{c}±0.3	58.5^{a}±0.7	57.5^{b}±0.7	57.2^{b}±0.7	55.2^{c}±0.2	0.0032

a---d Means (±SE) in the same row with different superscripts are significantly different (P≤ 0.05).
Values in each row are means for 3 replicates of each treatment (30 birds per each).
G1 to G5: Control, 200 mg Neomycin/kg diet, 1g probiotic/kg diet, 1.5g probiotic/kg diet, 2g probiotic/kg diet, respectively.

Gaskins *et al.* (2002) stated that the dietary supplementation of probiotic increased growth performance in broilers. Casas *et al.* (1998) demonstrated that the turkey given *Lactobacillus reuteri* had better body weight gain by 4.8% at 120 days of age as compared to that of birds fed the control diet. Similarly, Lan *et al.* (2003) , reported that broiler chickens given *Lactobacillus agili* and *Lactobacillus salavarius had* significantly had increased body weight gain (BWG) by 10.7% than the control. Jalaludeen *et al.* (2005) reported that the 0.025% probiotic supplemented birds had significantly higher BWG than that the control. In contrast, Maiolino *et al.* (1992) found no significant differences in weight gain of chicken given diet with or without *Lactobacillus cultures*. Lima *et al.* (2003) showed also similar body weight gain in birds supplemented or not with probiotics.

Mortality rate

The total mortality rate of birds in G4 (1.5g probiotic/kg diet) during 6 weeks experimental period was lower than those of the other groups (Table 2). The results of numerous studies showed that probiotics had positive effects on health and immune response (Griggs and Jacob, 2005). The authors attributed the improved performance of chickens fed probiotics to the microstructures in the intestine, where the villus height and the goblet cell numbers increased, while the crypt depth is decreased. They added that probiotics improved the morphology of the intestinal tract which improved the absorption of the nutrients. They also reported that, probiotics had the potential to reduce the risk of infection by pathogens and to eliminate the antibiotic resistance among pathogenic organisms.

Furthermore, the carcass contamination by gut-associated pathogens appeared to be reduced and therefore public health concerns are decreased. However, many researchers reported that dietary antibiotics were associated with the inhibition of pathogen growth (Gaskins *et al.*, 200 and; Jalaludeen *et al.*, 2005). Similarly, the findings of Sun *et al.* (2005) indicated that birds fed diets free of antibiotic growth promoters resulted in higher mortality than did the dietary feeding with an antibiotic.

Feed intake:

The supplementation of both antibiotic and probiotics did not affect feed intake (Table 4). These results are were similar to those of Contrearas-Castillo *et al.* (2008) who reported that FI of birds fed probiotics was similar to that of birds fed the control diet in all rearing stages. However, the results of Balevi *et al.* (2000) indicated that supplementation with probiotic at a level of 0.5g/kg diet caused some improvement in feed intake. Regarding ling the antibiotic effect, Contrearas-Castillo *et al.* (2008) citied that birds fed zinc bacitracin (antibiotic) during 1-4 days rearing period had the highest FI as compared to birds fed probiotic and control diets (P<0.05), whereas during 1-14 and 1-28 days, the FI of zinc bacitracin group was similar to those of probiotics groups (1g probiotic/kg diet and 0.5g probiotic/kg diet) but higher than both of the control or 0.05g probiotic/kg diet groups (P≤0.05). Also, Ignatova *et al.* (2009) reported administered that using probiotic in broilers diet affected positively their FI (P≤0.05) by about 7.8% more than of the control diet. Similar results in chickens fed probiotics were reported by Mountzouris *et al.* (2007).

Table 4. Feed intake (g/bird/day) as affected by dietary Neomycin antibiotic and different levels of probiotics

Treatment Age	G1	G2	G3	G4	G5	Significance level
0 -2 weeks	62.1±0.7	55.5±1.6	56.3±2.8	56.4±1.6	53.1±2.2	0.0697
3-4 weeks	115.2±0.3	116.2±0.9	111.8±1.5	111.1±2.8	112.4±1.6	0.1907
5-6 weeks	183.8±1.5	186. 7±0.7	184.4±1.0	180.7±1.1	183.3±3.5	0.3275
Overall mean	120.4±0.8	119. 5±0.5	117.5±0.6	116.1±1.3	116.3±2.2	0.1211

G1 to G5: Control, 200 mg Neomycin/kg diet, 1g probiotic/kg diet, 1.5g probiotic/kg diet, 2g probiotic/kg diet, respectively.
Values in each row are means for 3 replicates of each treatment (30 birds per each).

Table 5. Feed conversion ratio (g feed/g gain) as affected by dietary Neomycin antibiotic and different levels of probiotics

Treatment Age	G1	G2	G3	G4	G5	Significance level
0 -2 weeks	1.68^{a}±0.01	1.63^{a}±0.02	1.55^{b}±0.02	1.65^{a}±0.02	1.53^{b}±0.03	0.0011
3-4 weeks	1.88^{a}±0.03	1.85^{a}±0.01	1.68^{b}±0.02	1.71^{b}±0.03	1.87^{a}±0.02	0.0002
5-6 weeks	2.67^{a}±0.04	2.38^{c}±0.03	2.66^{a}±0.03	2.52^{b}±0.04	2.67^{a}±0.04	0.0003
Overall mean	2.16^{a}±0.01	2.04^{b}±0.02	2.05^{b}±0.02	2.03^{b}±0.01	2.12^{a}±0.02	0.0006

a—c Means (±SE) in the same row with different superscripts are significantly different (P≤ 0.05)
G1 to G5: Control, 200 mg Neomycin/kg diet, 1g probiotic/kg diet, 1.5g probiotic/kg diet, 2g probiotic/kg diet, respectively.

Feed conversion ratio

Data on feed conversion rate are presented in Table 5. During 0-2 weeks of age, the birds of G3 and G5 had significantly better feed conversion ratio (FCR) than those of the other groups (G1, G2 and G4). During 3-4 weeks of age, birds of G3 and G4 had significantly better FCR than those of the other groups (1, 2 and G5). During 5-6 weeks of age, the birds of G2 had significantly better FCR than those of G1, G3, G4 and G5, while birds of G3 had significantly better FCR than those of birds in groups 1, 3 and 5.

The birds fed antibiotic diet (G2) or those received levels of 1g and 1.5g probiotic/kg in diets (G3 and G4) had significantly better FCR during the period 0-6 weeks than those of birds fed the control (G1) and 2g probiotic/kg diets (G5). These results agreed with those of Gaskins *et al.* (2002), who stated that the dietary antibiotic was associated with an improvement in poultry FCR and the inhibition of pathogens growth. Contrearas-Castillo *et al.* (2008) reported that birds fed the control diets during the experimental period had significantly lower FCR than in birds fed antibiotic and 1g probiotic/kg diet. The FCR was not different among control, 0.5g probiotic/kg, and 0.05g probiotic/kg diet groups. In contrast, some researchers did not find statistical differences in FCR of birds during the rearing period among the experimental groups supplemented with probiotics, antibiotics, or without antibiotics (Correa *et al.* 2003). Others reported that the dietary supplemented antibiotics were associated with an improvement in poultry growth and FCR due to the inhibition of pathogen growth (Gaskins *et al.*, 2002).

Previous results of Balevi *et al.* (2000) indicated that supplementing the diet with a probiotic at a level of (at 0.5g/kg diet) caused some improvement in FCR. Similarly, Ignatova *et al.* (2009) indicated administered that supplementing probiotic in broilers diet affected positively the FCR (P<0.05) by 8.0% as compared to the control diet. Also, numerous studies showed that probiotics had a positive effect on FCR of chicken (Mountzouris *et al.*, 2007) and on health and immune response (Griggs and Jacob, 2005).

The improvement in FCR due to the beneficial effects of probiotics represented in toxin neutralization, prevention of development and multiplication of specific bacteria, change in microbial metabolism and immunity stimulation (Fuller, 1989), in addition to the prevalence of their population against the adverse pathogens of digestive system (Bilgili and Moran, 1995). The authors stated that the prevalence of useful microorganism over harmful ones, improved FCR. Also, Tannock *et al.* (1990) reported that lactic acid producing bacteria are represented among the members of the normal microflora and are capable to inhibit the digestive tract pathogens of many animal species. Bilgili and Moran (1995) and EL-Nagmy *et al.* (2007) demonstrated that adding whey to the diet, contributes to digestibility and absorption of the nutrients in diet due to its capability to produce an acidic condition which is suitable for growth of lactobacillus and increase the digestibility and absorption of the nutrients.

Caracas criteria:

Data of carcass criteria are presented in Table (6). The differences in the percentages of dressed carcass, body organ weights (gizzard liver, heart, giblets, and spleen) and body organ lengths (intestines and ceca) were insignificant among all groups. The abdominal fat percentage in G1 and G4 were lower than those of the other groups. These results are in agreement with those of Mandai *et al.* (1994), Ayasan and Okan (2001), Islam *et al.* (2004), and Ignatova *et al.* (2009). Ayasan and Okan (2001) investigated the effect of four levels of probiotic on fattening performance and carcass characteristics of Japanese quails. The results showed that the carcass characteristics were not affected by the probiotic supplementation. Also, Ignatova *et al.* (2009) found no significant differences in the carcass yield among the control and probiotic experimental groups. In addition, Mandai *et al.* (1994) found that probiotics feeding did not have any influence on the carcass yield. Islam *et al.* (2004) found that supplementation of probiotics had no effect on the weight of internal organs.

Table 6. Dressed carcass, body organ weight, abdominal fat and body organ length as affected by dietary antibiotic Neomycin and different levels of probiotics

Treatment Items	G1	G2	G3	G4	G5	Significance Level
Dressed carcass (including giblets) (%)	79.5 ±1.0	79.5±0.6	79.1±0. 6	80.0 ±1.0	78.3±0.6	0.6011
Abdominal fat (%)	0.76^{c}±0.05	1.40^{a}±0.04	1.37^{a}±0.08	0.91^{c}±0.03	1.20^{b}±0.04	0.0001
Body organ weights (%)						
Gizzard	1.4±0.1	1.3±0.1	1.5±0.1	1.4±0.1	1.6±0.1	0.1719
Liver	2.1±0.2	1.9±0.1	1.9 ±0.1	2.1±0.1	1.9±0.1	0.1719
Heart	0.6±0.1	0.5 ±0.1	0.6 ±0.1	0.7 ±0.1	0.4 ±0.1	0.5290
Giblets	4.1±0.09	3.7±0.09	4. 0±0.18	4.2±0.11	3.9±0.07	0.1500
Spleen	0.18±0.03	0.16±0.03	0.18±0.02	0.23 ±0.03	0.23 ±0.01	0.3019
Body organ length of intestines (cm)						
Intestines	227. 7±6.4	218. 7±4.0	194. 7±2.0	203. 7±1.0	212. 3±4.0	0.5362
Ceca	40. 3±0. 3	44. 7±2.9	35. 0 ±2. 9	37. 7 ±2.6	41.3±1.2	0.2608

a---c Means (±SE) in the same row with different superscripts are significantly different ($P \leq 0.05$).
Values in each row are means for 3 replicates of each treatment (9 birds per each).
G1 to G5: Control, 200 mg Neomycin/kg diet, 1g probiotic/kg diet, 1.5g probiotic/kg diet, 2g probiotic/kg diet, respectively.

CONCLUSION

From the obtained results, it can be concluded the supplementation with of 1.5 g probiotic/kg diet as an alternative to antibiotics in broilers is highly recommended to obtain higher growth performance, improved feed conversion and lower mortality, without adverse effect on abdominal fat and carcass traits.

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أداء وصفات الذبيحة لبداري التسمين والمضاف إليها البروبيوتيك أو المضاد الحيوي النيومايسين

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إستخدم فى هذا البحث مائة وخمسون كتكتوت عمر يوم من سلالة روس لإنتاج اللحم ، وزعت عشوائيا علي خمس مجموعات متساوية ، إحتوت كل منها علي ثلاث مكررات وبكل مكررة 10 كتاكيت. كانت المجاميع التجريبية كما يلى: الأولي G1 (كنترول) وغذيت على العليقة الاساسية بدون أي إضافات ، بينما كانت المجاميع الأربع الباقية (G2, G3, G4, G5) هى مجاميع معاملات ، حيث غذيت المجموعة الثانية على نفس العليقة مضافا إليها المضاد الحيوي نيومايسين بمعدل 200 ملليجرام/كيلو جرام عليقة ، أما المجموعات الثالثة والرابعة والخامسة فقد غذيت على نفس العليقة مضافا إليها بروبيوتيك بمعدل 1.0 ، أو 1.5 ، أو 2.0 جرام/كيلو جرام عليقة علي التوالي. تم تربية جميع طيور المعاملات في أقفاص بطاريات (أبعاد 97 سم عرض ، 50 طول ، 45 سم إرتفاع).

تم دراسة تأثير تلك المعاملات علي وزن الجسم ، ومعدل الزيادة في الوزن ، والغذاء المستهلك ، وكفاءة التحويل الغذائي ، ونسبة التصافي ، ونسب وزن بعض أعضاء الجسم ، وطول الأمعاء والأعورين حتي عمر 42 يوما. ويمكن إيجاز أهم النتائج فيما يلى: 1- حققت طيور المجموعة الثانية G2 والتي تم تغذيتها علي العليقة الأساسية المضاف إليها المضاد الحيوي وزن جسم نهائي ومعدل زيادة في الوزن أكبر معنويا من طيور المجاميع الأخري المغذاة علي المستويات المختلفة من البروبيوتيك أو الكنترول. 2- لوحظ أن طيور المجموعتين الثالثة والرابعة والمغذاة علي العليقة الأساسية مضافا إليها البروبيوتيك بمعدل 1 جرام ، 1.5 جرام/كيلو جرام عليقة قد حققت أعلي وزن جسم ومعدل زيادة في الوزن عن طيور المجموعتين الأولي والخامسة (كنترول ، عليقة البروبيوتيك بمعدل 2 جرام/كيلو جرام عليقة). 3- حققت طيور المجاميع الثانية ، والثالثة ، والرابعة أفضل كفاءة تحويل غذائي بالمقارنة بطيور المجموعتين الأولي والخامسة. 4- حققت طيور المجموعة الثالثة أقل نسبة نفوق عن طيور المجاميع الاخري. 5- لم يلاحظ أي تأثيرات معنوية لإضافة المضاد الحيوي أو البروبيوتيك علي نسبة التصافي ، ونسب وزن بعض أعضاء الجسم (القونصة ، والكبد ، والقلب ، والحوائج ، والطحال) وطول الأمعاء والأعورين. كذلك انخفضت نسبة دهن التجويف البطني في طيور المجموعتين الأولي والرابعة عن المجاميع الاخري.

توصي هذه الدراسة بإمكانية اضافة 1.5 جرام بروبيوتيك إلي العليقة كبديل للمضادات الحيوية في بداري التسمين للحصول على أداء نمو أعلى ، وكفاءة تحويل غذائي افضل ، وإنخفاض معدل النفوق ، وكذلك بدون أي تأثير سلبى علي دهن البطن و صفات الذبيحة.