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The Effect of Bactocell and Protexin Probiotics on Performance and Carcass Characteristics of Broiler Chickens

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ABSTRACT: To investigate the effect of bactocell and protexin probiotics on performance and carcass characteristics of broilers, an experiment was conducted with completely randomized design with 3 treatments in 4 replicates and 25 day old female cobb 500 broiler chickens for each replicate for forty-two days. Treatments include: 1-Control diet (without probiotics), 2-Control diet containing bactocell probiotic, 3-Control diet containing protexin probiotic.Traits major were feed intake ,weight gain, feed conversion ratio, percent of mortality, carcass characteristics and total cost of nutrition were measured at the end of 42 days.The results of this study indicated that feed consumption of control diet was higher but, the highest body weight gain was related to probiotics specially bactocell treated. Also, the best feed conversion ratio belonged to probiotic treated with bactocell and control treatment had the highest percentage of mortality.The results of carcass characteristics indicated that the treatment containing bactocell probiotic has the highest percentage of carcass efficiency and control treatment is the minimum. The highest percentage of abdominal fat related to protexin probiotic and the lowest it is related to treatment containing bactocell probiotic. The highest percentage relative liver related to control treatment and the lowest is related to treatment containing bactocell probiotic. Also, the highest percentage relative breast, thigh, neck and wing and shulder was observed in treatment containing bactocell probiotic. The percentage of relative gizzard between treatments was not significant and finally the lowest feed cost per kg of body weight was observed in the group containing bactocell probiotic.

***Keywords*:** Broilers, Probiotic, Performance, Carcass Characteristics.

INTRODUCTION

Probiotics based on natural conditions of microorganisms in the digestive tract and balance in nature made and as growth stimulants are used in animal and poultry feed. Now, there are increasing pressure to reduce or even eliminate antibiotics from poultry diets because of adverse effects of these compounds on human health and the possibility of bacterial strains to antibiotics strong. Furthermore, prohibition the use of antibiotics as growth promoters in Europe since 2006 and voluntary reduce the use of these compounds in other countries more serious is the need to find alternative ingredients. Awad et al, (2009) reported that probiotic microbial feed supplements or a living organism is called that through improving intestinal microbial balance it has beneficial effects on the host. Borell et al, (2007) reported that most probiotics are include Bifidobacter and some Gram-positive bacteria such as Lactobacilli, Enterococcus, Pediococcus, some bacillus and some yeasts such as Saccharomyces cerevisiae and Saccharomyces Boulardii. The use of probiotics in poultry nutrition first started by tottuero in 1973. The results study by Haddadin et al, (2001) showed that use of probiotics in poultry feed improved broiler performance compared to control group. Kabir et al, (2004) found that the use of protexin probiotic to 2 grams per liter of drinking water caused by improve the performance of broilers. The results study by Khosravi et al., (2008) showed that protexin probiotic can be a good alternative to antibiotic growth promoters. Taheri et al, (2010) found that with using probiotics, broiler body weight compared to control group increased and improved feed conversion ratio. Probiotics are organisms that contribute to intestinal microbial balance (Sainburg and Green, 2001). The results

study of Taherpour et al, (2009) showed that broilers fed diets supplemented with probiotic and prebiotic improved body weight gain and feed conversion ratio, but reduced feed intake. The results study of Nayebpor et al, (2007) showed that use of probiotic primalac in broiler diets body weight was significantly increased and antibody titer against IBD virus compared with the control group significantly increased. Application and effect of probiotic consumption in nutrition can affect the performance of poultry. Therefore, the main objective of the present study are investigation the effect of bactocell and protexin probiotics on performance and carcass characteristics.

MATERIALS AND METHODS

In this study 300-day-old male Cobb 500 chicks were tested. After hatching, chicks from incubation center were transferred to the research field. Rations for 3 Phase rearing with and without probiotics were adjusted by software UFFDA. Composition of the diets is shown in table 1. Metabolizable energy content of all experimental diets in each periods of the breeding was same considered. Chickens were randomly selected and kept in an open-sided partitioned deep litter pens. Adequate ventilation was ensured to make the birds comfortable. The floor was covered with wood shavings to act as absorbent for the faecal droppings. The feeding and water troughs were cleaned daily to ensure there was no contamination. All the necessary prophylactic and vaccination schedules were followed.

Location of the study

The research was conducted at the Broiler Research Station of Guilan. The experiment was lasted 42 days. Experiment was the same rearing conditions and management and water and feed consumption during the breeding was ad libitum.

Experimental design

Three hundred (300), day-old male Cobb 500 chicks were assigned to a Completely Randomized Design experiment with three treatments and four replications, in 12 experimental units with twenty-five birds in each replicate.

Table 1. Composition and analysis of experimental diets

Ingredient(%)	starter diets control	grower diets control	finisher diets control
Corn[1]	54.36	54.78	65.26
Soybean meal[2]	39.67	38.44	29.69
Poultry fat	2.15	3.14	1.47
Oyester shell	1.04	1.02	1.01
Dicalcium phos.	1.49	1.48	1.42
Salt	0.3	0.3	0.24
Premix[3]	0.5	0.5	0.5
D L-Methionine	0.24	0.25	0.2
Anti coccidiosis	0.05	0.05	0.05
Sodium bicarbonate	0.2	0.1	0.1
Calculated analysis:			
AME_n (kcal/kg)	2900	2970	2970
CP(%)	21.5	21	18.1
Cf(%)	3.97	3.89	3.51
Linoleic acids (%)	1.83	2	1.87
Ca (%)	0.86	0.84	0.82
$P_{available}$ (%)	0.43	0.42	0.41
Na(%)	0.19	0.16	0.14
Cl(%)	0.22	0.21	0.18
K(%)	0.95	0.93	0.79
Met(%)	0.58	0.57	0.49
Met+Cys(%)	0.94	0.93	0.81
Lys(%)	1.2	1.41	1.18
Arg(%)	1.42	1.17	0.96
Tre(%)	0.84	0.82	0.7
Try(%)	0.32	0.31	0.25

[1]- 8% cp.-[2]-43% cp.-[3]-provided per kg of diet : vitamin A , 9 , 000 Iu ; vitamin D_3 , 1,500 Iu ; vitamin E , 10 Iu; vitamin K_3 , 5 mg ; vitamin B_{12} , 0.007 mg ; thiamin , 0.4 mg ; riboflavin , 6 mg ; folic acid , 1 mg ; biotin , 0.15 mg ; pantathenic acid , 12 mg ; niacin , 35 mg ; pyridoxine , 4 mg ; choline , 1 , 000 mg ; Mn , 60 mg ; Cu , 5 mg ; Zn , 50 mg ; Se , 1 mg ; I , 0.35 mg ; ethoxyquin , 1,25 mg .

*-To this control diets in each period (starter, grower and finisher) respectively, 900 gram, 420 gram and 225 gram per ton bactocell and protexin probiotics were added.

Data Collection

This study was conducted to investigate the effect of Bactocell and Protexin probiotics on performance and carcass characteristics of Cobb 500 broiler chickens for 42 days. Experimental treatments is the include of control diet (without probiotic), control diet containing bactocell probiotic and control diet containing protexin probiotic. The chicks weighed at the beginning (1 day) and at the end of the experimental period (42 days). To calculate the average daily weight gain of chicks the method was used of chicken day until died chicks during the experiment be considered and carefully tested does not reduce. With chickens weighing, the amount of feed consumed per experimental unit after deducting the residual value at the end of the feed were weighed from at the beginning of the period and to calculate the average daily intake of poultry was used in the same way until feed intake of chicks during the experiment be considered and carefully experiment does not reduce. After these steps feed conversion ratio of each experimental unit was determined. Then at the age of 42 days from each experimental unit 2 chicks close to the average weight of herd selected and after installing a number starved for 10 to 12 hours until to be emptying gastro intestinal tract and then kill the chickens and were feather picking. Heads, feet and intestines isolated but the heart, liver and gizzard after emptying their contents has been into the abdominal cavity and all of them as a set percentage of carcass weight. Simultaneous determination of carcass efficiency percentage, abdominal fat around the heart, liver, gizzard and intestines were collected for physical and the percentage of abdominal fat based on live weight was calculated. To calculate the average percent relative weights of liver, gizzard, thigh, breast, neck and wing and shulder in 42 days the birds are slaughtered, begining each weight of these organs weight in grams and the its relative percentage based on live weight was calculated. Feed cost per kg weight gain was calculated using the following formulas:

Feed cost per kg weight gain = Feed cost per unit × FCR

Statistical analysis

The SAS (2001) software was used for data analysis and Duncan (1955) test was used for average comparison at 5% level of significance. The linear model below was used for the data analysis.

$Yij = \mu + Ti + \varepsilon ij$

Where Yij= the value of each observation

μ= overall general mean common to all observations

Ti= the effect of ith treatment (i = 1, 2, 3)

εij = random error effects peculiar to each observation

RESULTS AND DISCUSSION

Average indices measured the entire period is presented in table 2. The results of this study showed that statistically Feed intake, body weight gain and feed conversion between the experimental groups were significantly affected by experimental rations ($p<0.01$). Accordingly most of the feed consumption is related to the control and lowest feed consumption in treatments containing probiotics was observed**.** Process weight gain of the experimental treatments in the total period of the breeding such that chickens fed diet containing bactocell probiotic higher weight and control the lowest weight gain demonstrated. According to table 2 be noted that among treatments for feed conversion there is a difference ($p<0.01$) and at the whole period, bactocell treatment the lowest (best) feed conversion and control has the highest (worst) feed conversion. In the present study with the use of experimental treatments no mortality were observed. The percentage of carcass efficiency significant difference was observed between treatments ($p<0.01$), and treatment of the bactocell probiotic, the highest percentage and control the lowest percentage of carcass demonstrated. The highest abdominal fat in treatment of protexin probiotic and lowest abdominal fat in treatment of bactocell probiotic was observed. The relative weight of the liver, in control treatment is further compared to other treatments. The relative weights of the breasts, thigh, wings and shulder and neck with the use of bactocell treatment compared to other treatments is greater. However, the percent relative weight of gizzard was not affected by different experimental treatments. The lowest feed cost per kg of body weight also was observed with bactocell treatment.

In the present study, consuming diets containing probiotics is lower than the control diet. The results of the experiment by Murry et al.(2006) showed that adding protexin probiotic to the diet of broilers lead to reduced feed intake that is the results of this study corresponded. Koenen et al.(2004) reported that probiotic microorganisms after the establishment of the host intestinal tract through production of metabolites and the strengthening the

immune system caused by host health and health of birds also through increased digestibility and greater access to nutrients, reduced feed intake may explain. While, Willis et al, (2007) and Yalcirkayl et al.(2008) reported that additive intake of probiotics have no effect on feed intake in broilers. The difference between the reports of different investigators about the effect of probiotics on feeding birds depends on the difference in breeding management and environmental conditions. In the present study, lower consumption diets containing probiotics compared to control diet, increase the availability of nutrients and improves digestion by adding of consumption of probiotics as a result, birds need to consume more feed in order to access these nutrients is reduced. It seems that gain obtained in the present study in birds of fed diets containing bactocell probiotic through changes in microbial balance in the gastrointestinal tract, reducing the acidity of the gut, enzymatic modification of bacterial activity in the gut, activation of bacterial enzymes, improving the health of intestinal epithelium and strengthening the immune system caused by increase the digestibility and absorption of nutrients and thereby improve the growth performance of birds. Azza et al, (2012), Anjum et al, (2005) and Roceviciute-Stupeliene et al, (2007) found that addition of probiotic products to the diet lead to weight gain in broilers compared to the control group which is consistent with the findings of the present study. Ashayerizadeh et al, (2009) found that body weight increases with the addition of dietary primalac probiotic, these findings correspond with the results of the present study. According to studt by Willis et al, (2007) the reason of body weight gain in chicks fed with probiotics increased intake nutrients, especially fatty acids, glucose, nitrogen fixation and is decreased activity of the urease-producing bacteria. Zhang et al, (2005) found that the use of bactocell probiotic in broiler diets has no effect on feed conversion which is contrary with this study. Anjum et al, (2005) and Sabatcova et al, (2008) separately the effect of probiotics on improving feed conversion in broilers reported which is consistent with the findings of the present study. It seems that the use of diets containing probiotics especially bactocell probiotic lead to increased growth and replacement of useful microorganisms in the digestive tract and reduce the acidity of probiotic consumption avoid the growth of harmful and urease producing bacteria and the digestion and absorption and availability of nutrients due to bird health improved which resulted is improved body weight gain and feed conversion.

Due to higher weight gain in the bactocell treatment carcass percentage was higher in this treatment compared to other groups. Shabani et al, (2012) reported that supplementation of diets with probiotics have a significant effect on carcass weight which is consistent with the findings of the present study. It seems that improve nutrient intake, increased nitrogen availability, glucose and reduce abdominal fat lead to an increased carcass efficiency at containing bactocell probiotic treatment in the present study.

According to same energy in different experimental treatments in each period, one reason for the decrease in carcass fat in chicks fed bactocell probiotic,this is the probiotic microorganisms in the digestive tract of birds interfere in the absorption of cholesterol and fatty acids thus it is possible probiotic microorganisms may reduce the absorption and storage of fat in the abdominal area. Toghyani et al, (2011) and Santoso et al, (2001) separately the effect of probiotics on decrease in abdominal fat in broilers reported which is consistent with the findings of bactocell treatment in the present study. The relative weight of liver, highest in the control treatment and lowest percentage of relative weight was observed in bactocell treatment. Liver weight reduction by probiotic bacteria can be attributed to detoxification properties. Fuller, (2001) reported that the phenomenon of competitive elimination of beneficial bacteria caused by prevention of colonization of pathogens and the consequence of the presence of beneficial bacteria, liver undergo detoxification is less pressure that this is the reason for relative weight loss of the liver in the present study.

Whereas consumer demand has caused breast meat production to be the first goal breeding of broilers, genetic selection done by poultry breeding companies is leads to a relative increase in breast meat and lower organs non-beneficial and abdominal fat. In this study the highest relative weight of breast in the bactocell treatment and lowest in the control was observed. Kabir et al, (2004) and Ashayerizadeh et al, (2009) found that addition of probiotics to the diet of broilers will lead to improved breast meat which is consistent with the results of the present study. The higher relative breast weight in bactocell treatment compared to other treatments is improved nutrient intake and increased nitrogen availability due to the presence of beneficial bacteria.

According to table 2, highest relative weights of the thigh , wing and shulder and neck with the use of bactocell treatment has been achieved. Altaf et al, (2007); Ashayerizadeh et al, (2009) and Shabani et al, (2012) reported that adding probiotics to broiler diets can lead to weight gain of thigh and neck which is consistent with the results of the present study. The higher relative of thigh , wing and shulder and neck weights in bactocell treatment compared to other treatments is improved nutrient intake and increased nitrogen availability due to the presence of beneficial bacteria. However, the relative percentage of gizzard was not affected by different experimental treatments. The lowest feed cost per kg live weight of chickens were found in the experimental group containing bactocell probiotic, that due to suitability of FCR in this experimental group is compared to other groups.

Table 2. The effect of different experimental groups on performance and carcass characteristics of broilers

Parameter	Dietary treatments			
	Control (without probiotic)	bactocell	protexin	SEM
Feed Intake (gr/bird) 0 to 42 d	6178.63 a	6017.10 b	5953 b	25.48
Weight Gain (gr/bird) 0 to 42 d	3250 c	3587.75 a	3471.25 b	28.47
Feed Conversion (gr/gr) 0 to 42 d	1.89 a	1.67 c	1.71 b	0.009
Carcass Efficiency Percentage 42 d	75.5 c	77.6 a	76.9 b	0.007
Abdominal Fat Percentage 42 d	3.58 ab	3.55 b	3.66 a	0.002
Liver Percentage 42 d	2.22 a	1.79 b	2.20 a	0.002
Breast percentage 42 d	24.78 c	25.7 a	25.11 b	0.0002
Thigh Percentage 42 d	20.7 c	22.6 a	21.9 b	0.0002
Wing and Shulder Percentage 42 d	7.11 c	8.36 a	7.45 b	0.0004
Neck Percentage 42 d	5.33 c	5.67 a	5.50 b	0.0006
Gizzard Percentage 42 d	0.87 a	0.86 a	0.87 a	0.0004
Feed Cost per kg body weight(Rials) 0 to 42 d	33930.8 a	31958.1 b	32581.3 b	110.28

[a-c] Value within a row with no common superscripts are significantly different ($p<0.05$).

CONCULSION

In the present study, using probiotics especially bactocell in broiler diets than control diet has shown the best performance.

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