

Efficiency of A Multi-strain Probiotic (Protexin) on Performance and Carcass Traits in Broiler Chicks

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Abstract. A feeding trial was conducted to investigate the effects of dietary supplementations of multi-strain probiotic (Protexin) on broiler performance, carcass yield and organ weights of broiler chicks. A total of 96 seven-d-old mixed sex broiler chicks (Ross 308) were weighed and randomly allocated to two treatment groups, each with 4 replicate pens of 12 chicks. The experimental diets consisted of a basal diet without additive (Control) and 0.2 g kg⁻¹ probiotic (protexin). At day 42, two birds per replicate were slaughtered for the determination of carcass traits. Organ weights, body weight, feed intake and feed conversion ratio index were not markedly affected by dietary treatments. Carcass yield increased in broilers fed diets containing probiotic (P<0.05). In conclusion, our results suggest that protexin could be used to increase carcass yield of broiler chicks.

Keywords: Performance, Probiotic, Carcass traits, Broiler.

1. Introduction

In the poultry industry, antibiotics are used worldwide to prevent poultry pathogens and disease so as to improve poultry productivity and profitability. However, issues such as loss of antibiotic efficiency along time and risk of residues in food of animal origin, with the possible development of bacterial resistance in humans, have concerned consumers [1], creating a significant problem for poultry production. As a consequence, it has become necessary to develop alternatives using to animal growth promotion and disease prevention.

Probiotics include viable microbial and microbial fermentation products which are beneficial to decrease the undesirable microflora population in the gastrointestinal tract of chicks [2]. Protexin is a multi-strain probiotic used in poultry production (Probiotics International Limited, UK). Protexin contains naturally occurring nine different species of beneficial microflora which are generally regarded as safe by the American Food and Drug Administration [3].

Therefore, the objectives of the present study were to investigate the performance and organ weights of broilers supplemented with probiotic Protexin as alternative of antibiotics.

2. Materials and Methods

2.1. Animals and Dietary Treatments

A total of 96 seven-day-old broiler chicks (Ross 308) were weighed and randomly allocated into 2 experimental groups with 4 replicates of 12 birds per replicate. The probiotic Protexin (*Streptococcus salivarius* spp. *Thermophilus*, *Lactobacillus* (*L*) *delbrueckii* sub spp. *bulgaricus*, *L. acidophilus*, *L. plantarum*, *L. rhamnosus*, *Bifidobacterium bifidum*, *Enterococcus faecium*, *Candida pintolopesii*, and *Asperigillus oryzae*) was supplemented to basal diet with no additives. The dietary treatments were basal diet (control) and control + 0.2 g Protexin/kg diet. Chicks were maintained on these treatments to 6 weeks of age. All birds

were fed and watered ad libitum to 42 days of age, nutrients compositions of the diets for quails were based on the National Research Council [4] recommendations. Continuous lighting was maintained.

Table 1: The ingredient and calculated composition of basal starter, and grower diets

Item	Starter	Grower
Ingredient, g/kg		
Corn	584.2	584.8
Soybean meal	315.8	300.7
Soybean oil	25.2	55.0
Fish meal	45	30
Dicalcium phosphate	9.3	8.0
CaCO ₃	10.6	11.7
NaCl	2.0	2.9
Oyster shell	1	1
Trace mineral premix ¹	2.5	2.5
Vitamin premix ²	2.5	2.5
DL-Methionine	1.5	0.8
L-Lysine	0.4	0
Calculated composition		
Metabolizable energy (kcal/kg)	3000	3200
Crude protein (g/kg)	215.6	200.0
Calcium (g/kg)	9.7	9.0
Available phosphorus (g/kg)	4.2	3.5
Methionine + cysteine (g/kg)	8.4	7.2
Lysine (g/kg)	12.7	11.2

¹ Provided the following per kg of diet: Mg, 56 mg; Fe, 20 mg; Cu, 10 mg; Zn, 50 mg; Co, 125 mg; I, 0.8 mg.

² Provided the following per kg of diet: vitamin A, 10,000 IU; vitamin D₃, 2000 IU; vitamin E, 5 IU; vitamin K, 2 mg; riboflavin, 4.20 mg; vitamin B₁₂, 0.01 mg; pantothenic acid, 5 mg; nicotinic acid, 20 mg; folic acid, 0.5 mg; choline, 3 mg.

2.2. Measurements and Slaughter

Body weights of broilers were determined at 7, 21, and 42 day of age. Daily body weight gain and daily feed intake were recorded in different periods and feed conversion ratio (FCR) was calculated. Mortality was recorded daily and the cause of mortality was determined whenever possible. At 42 day of age, 2 birds per replicate were randomly chosen, based on the average weight of the group and slaughtered through cutting carotid arteries and partial slicing of the neck by a manual neck cutter. Eviscerated weight, breast weight and thigh weight were weighed and calculated as a percentage of live weight. Liver, pancreas and small intestine were also removed, weighed and calculated as a percentage of live weight was calculated.

2.3. Statistical Analysis

The data were subjected to analysis of variance procedures appropriate for a completely randomized design using the general linear model procedures of SAS Institute (2008). Means were compared using Tukey test, and statements of statistical significance are based on ($P < 0.05$).

3. Results and Discussions

3.1. Performance and Carcass Traits

Data on performance parameters are summarized in Table 2. Body weight, feed intake and feed conversion ratio index were not markedly affected by dietary treatments. Anjum et al. [5] reported that, protexin supplementation is beneficial for growth performance of broiler chicks. In another trial use of protexin had not any significant effect on performance criteria [6]. Azadegan mehr et al. [7] reported that inclusion of protexin into diet significantly decreased feed cost per kilogram of live weight gain. In the present study our results showed that none of the treatments had any significant effects on any of the parameters measured. Our results agree with the findings of Guntal et al. [6] and Mountzouris et al. [8], who found that the use of probiotic products in the feed had no significant effect on broiler BW.

Table 2: Effect of experimental diets on performance indices of broilers at different ages

Variables	Dietary treatments		SEM ¹
	Control	Probiotic	
Daily weight Gain (g)			
7-21 d	23.79	25.4	0.93
21-42 d	64.28	65.26	0.59
7-42 d	48.1	49.33	0.73
Daily feed intake (g/d)			
7-21 d	49.86	50.13	0.15
21-42 d	144.64	154.43	5.83
7-42 d	106.73	112.7	3.98
Feed:gain (g:g)			
7-21 d	2.09	1.97	0.07
21-42 d	2.25	2.36	0.13
7-42 d	2.21	2.28	0.05

¹ Standard error of mean.

Table 3: Effect of experimental diets on carcass traits and internal relative organ weight of broilers at 42 d.

Variables	Dietary treatments		SEM ¹
	Control	Probiotic	
Carcass (%)	66.86 ^b	70.18 ^a	1.56
Breast weight (%)	19.62	22.26	1.36
Thigh weight (%)	19.37	19.71	0.23
Liver (%)	2.2	1.9	0.18
Pancreas (%)	0.26	0.32	0.04
Small intestine (%)	3.2	2.5	0.43

^{a,b}Values in the same row not sharing a common superscript differ (P < 0.05).¹ Standard error of mean.

Table 3 shows carcass traits and internal relative organ weight of broilers at slaughter as a function of treatments. The percentage weight of carcass traits were not affected by dietary treatments except for the percentage of the eviscerated weight that increased in the broilers fed diets containing probiotic (p<0.05).

4. Conclusion

The findings from this experiment indicated that the supply of probiotic to broiler chicks feeds for 35 days have limited effect on chick performance criteria. The study is realized with minimum stress and maximum hygienic conditions, and it would get more positive results under similar circumstances in practical conditions.

5. Acknowledgement

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6. References

- [1] S. Thomke, and K. Elwinger. Growth promotants in feeding pigs and poultry. II. Mode of action of antibiotic growth promotants. *Ann. Zool. Technol.* 1998, **47**: 153-167.
- [2] SH. Chiang, and WM. Hsieh. Effect of direct fed microorganism on broiler growth performance and litter ammonia level. *Asian-Aust. J. Anim. Sci.* 1995, **8**:159-162.
- [3] Fuller R. Probiotics in man and animals. *J. Appl. Bacteriol.* 1989, **66**: 365-378.
- [4] NATIONAL RESEARCH COUNCIL: Nutrients Requirements of Poultry, 9th rev., 157 pages, National Academy Press, 1994.
- [5] MI. Anjum, AG. Khan, A. Azim, and M. Afzal. Effect of dietary supplementation of Multi-Strain Probiotic on broiler growth performance. *Pakistan Vet. J.* 2005, **25**: 25-29.
- [6] M. Gunal, G. Yayli, O. Karahan, and O. Sulak. The effect of antibiotic growth promoter, probiotic or organic acid supplementation on performance, intestinal microflora and tissue of broilers. *Int. J. Poult. Sci.* 2006, **5**: 149-155.

- [7] M. Azadegan Mehr, M. Shams Shargh, B. Dastar, S. Hassani, and MR. Akbari. Effect of different level of protein and protexin on broiler performance. *Int. J. Poult. Sci.* 2007, **6**:573-577.
- [8] K. Mountzouris, P. Tsirtsikos, E. Kalamara, SG. Nitsch, G. Schatzmayr, and K. Fegero. Evaluation of the efficacy of a probiotic containing *Lactobacillus*, *Bifidobacterium*, *Enterococcus*, and *Pediococcus* strains in promoting broiler performance and modulating cecal microflora composition and metabolic activities. *Poult. Sci.* 2007, **86**:309–317.