Application of Probiotics in Poultry Production

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Abstract
In the last years probiotics have constantly increased in importance and aroused growing interest in animal nutrition. Probiotics are live microorganisms thought to be beneficial to the host organism. The bacteria of the probiotic attach to the intestinal mucosa, thereby forming a physical barrier that blocks the attachment of pathogenic bacteria. The mode of action of probiotics in poultry includes maintaining normal intestinal microflora by competitive exclusion and antagonism, altering metabolism by increasing digestive enzyme activity and decreasing bacterial enzyme activity and ammonia production, improving feed intake and digestion and neutralizing enterotoxins and stimulating the immune system. In experiment we research effect of probiotic on the performance of broiler chickens. A total number of 200 one day old broiler chickens were distributed to two dietary groups. Broiler chickens in control group were fed with standard feed mixture and experimental group with probiotics mixed with feed mixture. Body weight and GIT pH were recorded. Average body weight on the end of experiment in experimental group was 1493.6 g and 1689.6 g in control group. Average pH in experimental group was 2.79 in stomach, 6.28 in small intestine, 6.81 and 6.89 in caecum. In control group was average pH 3.54 in stomach, 6.41 in small intestine, 6.74 and 6.80 in caecum.

Keywords: body weight, broiler chicken, GIT pH, probiotic

1. Introduction

In the poultry industry, antibiotics are used worldwide to prevent poultry pathogens and disease so as to improve meat and egg production. However, the use of dietary antibiotics resulted in common problems such as development of drug-resistant bacteria [1], drug residues in the body of the birds [2] and imbalance of normal microflora [3]. Probiotic bacteria are used in a wide range of nutritional techniques in order to support the host organism during physiological strain, to reduce stress due to technology and to combat diarrheal syndromes [4]. Proposed mechanisms of pathogen inhibition by the probiotic microorganisms include competition for nutrients, production of antimicrobial conditions and compounds (volatile fatty acids, low pH and bacteriocins), competition for binding sites on the intestinal epithelium and stimulation of the immune system [5]. A good probiotic must fulfill some selection criteria such as membership among the normal intestinal microbiota, acid and bile tolerance, gut colonization, production of antimicrobial substances or bacteriocin. Then, it must easily to survive growth on a large scale, retain its viability under storage and field conditions, and be costeffective to use for farm animals [6]. Probiotic species belonging to *Lactobacillus*, *Streptococcus*, *Bacillus*, *Bifidobacterium*, *Enterococcus*, *Aspergillus*, *Candida* and *Saccharomyces* have a beneficial effect on broiler performance [7-9]. La Ragione [10] showed that oral inoculation of *Bacillus subtilis* spores could reduce intestinal colonization of *Escherichia coli* O78:K80 in chickens. These results were observed only when the challenge occurred 24 h after the oral inoculation of *B. subtilis*. They did not observe any inhibition of *E. coli* O79:K80 when the challenge occurred 5 d after spore inoculation. Weis [11] showed higher effect of *Enterococcus faecium M74* supplementation on slaughter weight

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(1807.51 vs. 1929.08 g; P<0.05) in comparison with Ross 308 (2126.63 vs. 2199.31g; P>0.05).

2. Materials and methods

The experiment was conducted with 200 one day old broiler chicks (Cobb 500) for a period of 42 days. The chicks were randomly distributed into 2 groups (A, B). Complete feed mixtures were used for feeding: starter period (days 0 – 18) HYD-01, growth period (days 19 – 31), HYD-02 and final period (days 32 – 42) HYD-03. Control group (A) was fed with standard feed mixtures and experimental group was fed with probiotics mixed with feed mixture. Feed and water were supplied *ad libitum* throughout the entire experiment. Body weight and GIT pH were recorded and calculated. Body weight was recorded before offering feed on the initial day, and then at weekly intervals up to 6 weeks. To determine the pH, 10 g of gut content from *stomachum, intestini* and *cecum* in two parts were collected aseptically in 90 ml sterilized physiological saline (1 : 10 dilution) [12] and pH was determined.

3. Results and discussion

Effect of probiotics used in broiler ration on live weight gain and pH are presented in Table 1 and Table 2. Non significant (P>0.05) difference in body weight of broilers among the groups were observed from initial age to the 4th weeks. From the 5th to finally part of feeding experiment was significant (P<0.05) difference in body weight of final fattening broiler chickens COBB 500.
In the 5th week of age was average weight in control group 1503 g and in the experimental group was 1190 g. In the 6th week was average weight in control group 1689 g and experimental group was 1360g. Our results are not compatible with the results with [13] who concluded that there is statistically significant influence of the supplementation of probiotics on slaughter weight. Other results from our experiment are focused on effect of probiotics on the performance of broiler chicks. Effect of probiotics on GIT pH in *stomachum*, *intestine cecum* 1 and *cecum* 2 are presented in Table 2.

Table 1. Effect of probiotics on the performance of broiler chicks

Age (weeks)	Average body weight (g)		SD	P Value	Level of significant
	A	B			
Body weight					
Initial weight	44	44	1.51	0.3243	(P>0.05)
1	146	127	11.55	0.0685	(P>0.05)
2	373	285	39.66	2.5518	(P>0.05)
3	706	500	90.55	1.8327	(P>0.05)
4	1098	800	138.64	1.1743	(P>0.05)
5	1503	1190	180.11	0.0001	(P<0.05)
6	1689.6	1493.6	200.69	0.0001	(P<0.05)

SD - standard derivation
P Value - statistical significance

Table 2. pH value of the GIT in dietary groups

GIT	pH		SD	P Value	Level of significant
	A	B			
Stomachum	3.54	2.79	0.71	0.127	(P>0.05)
Intestini	6.41	6.28	0.12	0.029	(P<0.05)
Ecum 1	6.74	6.81	0.30	0.360	(P>0.05)
Ecum 2	6.80	6.89	0.34	0.341	(P>0.05)

GIT - gastrointestinal track
SD - standard derivation
P Value - statistical significance

From our result it was observed non significant (P>0.05) in *stomachum, cecum* 1 and *cecum* 2, what is not compatible with [13], who reported pH reduction of the gut using by probiotics. Statistically significant (P<0.05) was observed in *Intestini.*

4. Conclusions

In our experiment we demonstrate statistically significant in the 5th weeks of age in body weight of broiler chickens COBB 500. But the other side, not statistically significant (P>0.05) was found on the end of fattening. Statistically significant (P<0.05) change of pH was in *Intestini.*

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