

EFFECTS OF PROBIOTICS AND PREBIOTICS ON THE PRODUCTION PERFORMANCE OF FATTENING CHICKENS

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Abstract

The goal of this research was to investigate the influence of probiotics and prebiotics added into the diet of fattening chickens, as an alternative to antibiotics. Probiotic BioPlus2B (*Bacillus licheniformis* and *Bacillus subtilis*) and a prebiotic TechnoMos (*Sacharomyces cerevisiae*) have been added at the level of 0.1%. The experiment lasted 42 days, whereby two mixtures have been used, starter until 21 days and finishing mixture from 21 to 42 days of life, all the same in regard to protein and energy content, differing only in the presence of probiotic and prebiotic. Chickens were divided into three groups, where the first group consumed mixture free of probiotic or prebiotic and served as a control group. During the trial body weight, daily weight gain, feed consumption and conversion were recorded. Body weight in the control group was 2080.60 grams, while the experimental groups of chickens achieved higher body weight for 7.04% with added probiotic and 2.63% with an addition of prebiotic. Daily weight gain in the control group was 48.52 g. Daily weight gain was higher for 7.19% with an addition of probiotic and 2.72% with an addition of prebiotic. Feed consumption of the control, probiotic and prebiotic group amounted 111.57 g, 111.37 g and 116.06 g respectively. Feed conversion ratio in the control group was 2.30 kg, probiotic group 2.14 and in the prebiotic group of chickens 2.33 kg.

Prebiotics in diets for fattening chickens had positive effect on body weight, daily weight gain and feed conversion without statistically justified confirmation ($P > 0.05$). The result of probiotic incorporation into chickens diet resulted in statistically significant ($P < 0.05$) higher values of body weights and daily weight gains, as well as better feed conversion.

Key words: *fattening chickens, probiotic, prebiotic, production parameters*

Introduction

An intensive production of healthy and high value food of animal origin, sets the high recommendation for animal husbandry and industry of animal food. The ban of European Union for use of antibiotics, as growth promoters, from the 1st January, 2006, onwards, provoked many investigations to find alternatives without antibiotic's sides' effects, such as resistance, genotoxic effects, and presence of residua in food of animal origin. The most used so called "alternatives to antibiotics", at last decade, became probiotics and prebiotics.

The quality and proportion of microorganism in the gut are relatively constant and typical for the particular periods of life and part of the intestine (Jensen, 1998), depending on animal species, environment, consumed feeds (Pluske et al., 2007) or feed additives. Probiotics, as "live, microbial cell preparation or microbial cell components with positive effect on health and performance of microorganism, by improving its intestinal balance" (Fuller, 2004), take their role through sanitary and nutritional effects (Fuller, 1999). Prebiotics can be classified as Prebiotics are defined as non-digestible food ingredients that affect the host beneficially by the modification of bacterial composition in the colon, where oligosaccharides and

polysaccharides were mostly investigated in different animal specie (Baurhoo et al., 2007; Bigs et al., 2007; Canibe et al., 2007; Liu et al., 2007).

Numerous investigations towards estimation of possible influence on production abilities of poultry showed effectiveness of probiotics and prebiotics (Kabir et al., 2004) especially in regard to higher body weight, daily weight gains, better feed conversion (Apate, 2008; Awad et al., 2009; Novak et al., 2010; Midilli et al., 2008; Panda et al., 2005; Racevichiute-Stupeliene et al., 2007; Khaksefidi and Ghoorchi-a, 2006; Tokic et al., 2007).

Having in mind potentially positive effects of probiotics and prebiotics, the aim of this research was to examine the effects of the probiotic preparation BioPlus2B and prebiotic Techno Mos on the production abilities of fattening chickens.

Material and methods

The experiment covered 156 one day old Cobb hybrid chickens divided into three groups with 52 animals. The first group, without an additive, was the control for other two groups whose diet contained 0.1% of the probiotic BioPlus 2B and the prebiotic TehnoMos. Diet content of energy and proteins was the same for all groups and difference was only regarding to the presence or absence of used additives.

Chickens diets contained optimal content of proteins in two feeding periods 21% (1-21. day) and 19% (21-42. day). During the experiment all necessary housing conditions were provided and were identical for all animals. Chicken weight was measured every seven days during the trial together with group feed consumption.

Obtained results were analysed by using Anova and differences treated with Tukey HSD test marking the difference of 0.5% significant.

Results and discussion

Average values of chicken body weights are presented in table 1.

Table 1. Average values of chicken body weights (g)

Grupa	Period tova							
	1. day	Index	21. day	Index	35. day	Index	42. day	Index
Control	42.75	100.00	670.78	100.00	1517.30	100.00	2080.60	100.00
Probiotic	42.90	100.36	612.10	91.25	1526.02	100.57	2227.04*	107.04
Prebiotic	42.25	98.85	677.55	101.01	1570.00	103.47	2135.29	102.63

* Statistically significant difference $P < 0.05$

At the beginning of the trial chickens were uniform regarding the body weight in all experimental groups ($P < 0.05$). At the end of the experiment it is obvious that experimental groups of chickens achieved higher body weight for 7.04% with added probiotic and 2.63% with an addition of prebiotic. Difference between control and probiotic group is statistically significant ($P < 0.05$). Similar results of probiotic and prebiotic dietary influence on body weight of chickens have been reported by other authors (Khaksefidi and Ghoorchi, 2006; Zhou et al., 2010; Novak et al., 2010).

Table 2 contains achieved average values of daily weight gains, consumption and feed conversion per feeding periods, as well as for the total experiment.

Table 3. Average values of daily weight gain (g) feed consumption (g) and feed conversion (kg)

Group	Daily weight gain (g)					
	1 -21 day	Index	21-42 day	Index	1-42 day	Index
Control	29.91	100.00	66.87	100.00	48.52	100.00
Probiotic	27.10	90.63	76.66*	114.63	52.00*	107.19

Prebiotic	30.25	101.16	69.42	103.81	49.83	102.72
Daily feed consumption (g)						
Control	62.01	100.00	161.12	100.00	111.57	100.00
Probiotic	62.57	100.89	160.17	99.41	111.37	99.82
Prebiotic	68.38	110.27	163.76	101.64	116.07	104.04
Feed conversion (kg)						
Control	2.07	100.00	2.41	100.00	2.30	100.00
Probiotic	2.31	111.35	2.09	86.71	2.14	93.14
Prebiotic	2.26	109.03	2.36	97.90	2.33	101.30

The results presented in table 2 show that control group achieved 48.52 grams of weight gain per day, while the prebiotic group achieved 49.83 grams, higher 2.72% in comparison with the control group. That difference was not statistically significant ($P > 0.05$). The best results regarding the daily weight gain were achieved in the probiotic group of chickens, 52 grams, 7.19% higher comparing it with the results of the control group. Analysis of variance showed that this difference was statistically significant ($P > 0.05$).

Feed consumption of the control, probiotic and prebiotic group amounted 111.57 g, 111.37 g and 116.06 g respectively. Feed conversion ratio in the control group was 2.30 kg, probiotic group 2.14 and in the prebiotic group of chickens 2.33 kg. As for other parameters, so for the parameters of feed utilization, best regards were accomplished in the group of chickens fed with diet containing 0.1% of probiotic. Our results are in accordance with the results of other authors (Apate, 2008; Awad et al., 2009; Zigic, 2006; Novak et al., 2010; Midilli et al., 2008; Panda et al., 2005; Raceviciute-Stupeliene et al., 2007; Tokic et al., 2007), but still remains to adapt the dose and methods of application of additives such as probiotics and prebiotics, to a specific farm and conditions at the farm.

Conclusions

The examination of probiotic and prebiotic inclusion into the diets of fattening chickens and their effects on the production abilities following conclusions can be made:

- Both, probiotic and prebiotic positive effect was expressed
- Probiotic BioPlus 2B significantly increased body weight and daily weight gain during the trial ($P < 0.05$),
- Prebiotic TechoMos increased body weight and daily weight gain during the trial but without statistical significance ($P < 0.05$),
- Both, probiotic and prebiotic improved feed utilization.

The research showed positive effect of probiotic and prebiotic on the production results of fattening chickens and can be considered for application as an alternative to antibiotics, especially during the stress periods.

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