The Effect of Selected Dietary Supplements on the Occurrence of Coccidia in the Alimentary Tract of Chicken

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Abstract
Poultry farming represents 30% of meat production worldwide. The occurrence of animal parasites is an enormous problem of poultry farming. This problem is recorded from factory farming as well as from small farming and causes financial losses. The aim of this study was to gain basic data about the occurrence of coccidia in the intestines and about the occurrence of coccidia oocysts in the excrements of indoor broilers and carrier hens. Broilers and carrier hens were fed by dietary supplements which were supposed to have influence on native gut microflora composition and on weight gain. The experiment was conducted on 250 individuals of broilers. Broilers were divided into 5 groups according to dietary supplement (one group consisted of 50 individuals). Experimental groups were as follows: prebiotics, probiotics, homeopathic, coccidiostatics. One control group was also made. In the experimental groups dietary supplements were served every day from the 8th to 22nd day after the birth. The samples of excrements were tested in a laboratory twice a week. During 42nd and 57th day after the birth the samples of intestines of death chicken were tested three times (five individuals was chosen from every experimental group). Every individual was weighted before the slaughter, the samples of intestines were screened for occurrence, amount and type of coccidia right after the slaughter. The decrease of frequency of coccidia oocysts occurrence in the excrements in the experimental group prebiotics, homeopathics and control group in comparison with experimental group probiotics and coccidiostats was proved. The frequency of coccidia oocysts occurrence was the lowest by the experimental group prebiotics and by control group. The frequency of coccidia oocysts occurrence was the highest by the experimental group probiotics and coccidiostats. The highest weight gains were recorded by the control group (ø 2.55) in comparison with the group with coccidiostats (ø 1.99).

Keywords: broilers, dietary supplements, coccidia.

1. Introduction

In the past, there was only a limited selection of feed supplements, they were less available and their quality was worse. Today, feed supplements belong to the field of modern medicine, they are accessible easily, commonly used, they have a good quality and a positive effect on the health status of the organism [1].

Ones of the best known animal feed supplements are probiotics and prebiotics. The other option how to promote good health status of the animals is homeopathic remedies. According to current definitions probiotics are living microorganisms which, when ingested in sufficient doses, positively affect the health of the organism [2]. Prebiotics are selectively fermented ingredients that enable specific changes in the large intestine, both in their composition and growth, as well as in activity of bacteria in the gastrointestinal tract. [3].
2. Materials and methods

250 pieces of one-day-old chicks of meat hybrid were used for experiment. Chickens were placed in a barn of school farm of the University of South Bohemia in Czech Budejovice and they were divided into five groups of fifty pieces - four of them were experimental and the fifth was a control one. Each preparation was given to chicken from 8th days to 14th day of age in all of selected experimental groups. The first experimental group received enriched Biopolym preparation in a dose of 0.02 ml to 3 liters of water. The second experimental group received enriched Lactovita preparation in a dose of a half tablet (2 g) in 3 liters of water and the third experimental group received a homeopathic preparation in a dose of 0.02 ml in 3 liters of water. The fourth group received a 20 ml dose of coccidiostats (about 10 million oocysts) in 3 liters of water only once during the experiment and it was in the 8th day of their life. The last, control group received the unmodified ration.

All chicken were fed with food without anticoccidics. In each of the intervals plastic mats were applied to all groups of hens, so as we could take samples of fresh faeces and subsequently investigate them coprologically. Then we observed the frequency of occurrence of coccidia oocysts under a light microscope.

During the experiment, the data logger was located to the barn scanning temperature differences every hour and subsequently an average daily temperature depending on the frequency of occurrence of coccidia oocysts was formed.

In order to confirm the incidence of coccidia oocysts in the intestinal tract and to identify better the type and number of coccidia, a detailed survey of all sections of intestines from slaughtered animals was made by veterinarian specialized in poultry health matters. This examination was carried out 3 times in total. Every week five pieces of each group were taken and each individual of them was weighed before the slaughter. The experiment lasted for 56 days.

3. Results and discussion

Figure 1 shows: the experimental groups Biopolym and Homeopathics have shown a decrease of coccidia oocysts in the droppings of chickens - these food supplements contained supporting substances which reduced the presence of the disease. Unlike the Lactovita experimental group had a significant incidence of coccidia oocysts in the droppings of chickens during the experiment - this food supplement did not have any effect on the reduction of infection.

In the control group the decrease of the number of coccidia oocysts in the chicken droppings was demonstrated only in the latter half of the attempt. The reason of the decreasing infection might be a longer time of reproduction, better disinfection of the environment, natural immunity, or the infection did not manage to manifest at all.

The incidence of infection in the group of coccidiostats may be influenced by a short period of observations in which a group did not manage to create a sufficient immunity.

The highest incidence of coccidia oocysts in the faeces is consistent with the results [7], that claims the largest occurrence of coccidia oocysts around the 28th day after birth.

The difference in effect of given preparations was not statistically proven.
To figures 2 and 3: the incidence of coccidia oocysts occurred after intestinal examination in all of groups, most frequently in the first section of the intestine, from the duodenum to the stem of the yolk sac, which is congenital protrusion of ileum, also called as diverticulum Meckeli. Furthermore, the incidence of coccidia oocysts occurred in a smaller extent also in the second section of the intestine, in the section from the stem of the yolk sac to appendixes. No findings were detected in the appendixes (the third section), which is the only location of the natural occurrence of *Eimeria tenella*. The results are not in the full compliance with the results of observation RUFF [8], where the *Eimeria tenella* was represented in a higher number than *Eimeria acervulina* in the intestines of birds in the control group.
In all groups *Eimeria maxima* was represented in a larger quantity (visible to the naked eye as a red dot, under the microscope as an oval oocyst). *Eimeria acervulina* (to the naked eye visible as a white dot, microscopic as a spherical oocyst) was represented in a smaller amount.

The difference in effect of given preparations was not statistically proven.

Figure 4 shows: the largest body weight gains were recorded in the control group and the lowest body weight gains were recorded in the group with coccidiostats. No death was detected in any of experimental groups and all chicken increased their weight.

The difference in effect of given preparations was not statistically proven.
4. Conclusions

The results of the observations of coccidia oocysts frequency in faeces and intestine in broiler for fattening in the period from December 2012 to February 2013 showed changes in experimental groups which were administered prebiotics and homeopathics and in the control group. There were no changes in the digestive tract in the experimental group treated both with probiotics, and coccidiostats. The results obtained in experimental groups show that the administration of homeopathic and Biopolymu have reduced the frequency of occurrence of coccidia oocysts in the intestine and faeces of hens versus the group whose food was enriched with Lactovita, where the frequency of coccidia oocysts did not decrease at all.

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