Influence of Selected Feeding Supplements on the Occurrence of Coccidias in Digestive Tract of Pheasants

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Abstract

The occurrence of coccidiosis is an enormous problem of pheasant farming. The aim of this study is to show, that this disease can be cured by unconventional dietary supplements. Dietary supplements which were used in this study were as follows: prebiotics (Biopolym), probiotics (Lactovita containing bacteria *Lactobacillus* sporogenes) and homeopathics. The experiment took place in the Rančd Daniela farm in the town Hůrka (close to the Horní Planá Town) from 1.7.2012 to 18.11.2012. Four groups of pheasants were made - three experimental groups and one control group. All groups were consisted of 13 individuals. The pheasant Phasianus colchicus was used in this experiment. Dietary supplements were served for two weeks, than the serving stopped for two weeks and continued again. The samples of excrements were tested all the study long using the floatation method in Sheather's sugar solution. The results were marked and evaluated. The favourable effect of Biopolym and homeopatics on the intestinal tract of pheasant was significant.

Keywords: coccidiosis, faeces, homeopatics, pheasant, prebiotics, probiotics

1. Introduction

Pheasant (Phasianus colchicus) is quite widespread species of feathered game in the Czech Republic, which is popular with hunters on the one hand and also with common consumers. Its numbers in the open air in the Czech Republic decreased gradually since 1975 (about 850,000 units) until 1995 (about 300,000 units) and until now kept at this level. It is originally an Asian species of gallinaceous bird that inhabits already for several centuries our meadows and fields. The male pheasant belongs with its colour and size to the most striking birds of our countryside. The largest part of its body is covered with the brown till honey coloured feathers with black tips. The flight feathers are tinged greyish-green. The neck of this bird is decorated with distinctive white edge that separates the brownish chest from the blue-green, shiny metallic head. In addition, the pheasant is decorated with a long tail with brown and black striped feathers. The female with her brownish-black spotted feathers is rather less striking. She is smaller in stature and her tail is shorter [1]. Family Phasianidae birds are members of the Asian avifauna whose one geographic form, *Phasianus colchicus colchicus*, has its original settlement west of the Urals, in the Caucasus-Black Sea region. This species spread thanks to men to Europe and during nearly three millenia was completely adopted here [2].

Coccidiosis remains a major economically important disease for the poultry industry, including intensively reared pheasants. The risk of clinical outbreaks is directly proportional to the concentration of bird populations. Young poultry show transitional predisposition to infectious

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diseases during the first week of life due to qualitative damage of bird in wild nature and obtaining the host defence [3]. Coccidiosis is one of the most frequently occurring mass disease in young pheasants, partridges and turkeys and may significantly limit the success of the whole breeding. Coccidia are unicellular parasites that in birds, like in mammals, primarily attack the intestinal mucosa and evoke inflammatory changes, known as coccidiosis [4]. Young pheasants are most sensitive to Eimeria infection during the first four days, after which they become more resistant. This period of a "transitional immunoincompetence" is caused by a general failure of T-cells to proliferate and secrete cytokines and functional immaturity of heterophils during the first week of defence [5].

In this study the aim of the experiment was to reduce the incidence frequency of coccidia oocysts in the faeces of pheasants while administering different additives. Chosen additives were homeopatics, probiotics and prebiotics. Homeopathy usually uses medicaments extremely diluted. Their effectiveness depends on bio-energy mechanisms. It uses extracts of plants and minerals for their medicine and adds derivatives of various modern drugs and chemicals in extreme dilution. It is also to be used in the fight against infectious diseases [6]. Several studies have shown that the use of homeopathy is appropriate under organic farming, while other alternative therapies seem to be relatively rare. The effectiveness of alternative treatments is generally poorly documented, especially in the case of homeopathy. The use of homeopathy therefore led to concerns that its use may have a negative impact on animal health [7]. Homeopathy does not cure the disease directly, but the individual itself is able to fight against it. It is important that the environment allowed to keep the balance of the patient and thus improving of the environmental factors has a great importance for successful homeopathic treatment [8].

Prebiotics are non-digestible food ingredients that promote the growth or activity of intestinal microflora and improve the health of the consumer. This usually involves hardly digestible or non-digestible oligosaccharides. These ones become in the colon a substrate for certain desirable bifidobacteria, which ferment them - main waste products are butyric, propionic and acetic acid [9]. Biopolym is a hydrolyzate of brown seaweed *Ascophyllum nodosum*, which is obtained in the cold coastal waters, especially near Iceland, but also in coastal areas of Norway and Canada [10]. Probiotics are live microorganisms that beneficially affect the health status of intestine by modifying of intestinal microflora, especially in young animals [11]. Handling of the intestinal microflora using dietary supplement of real microbe is a new approach not only from a nutritional point of view, but also as an alternative treatment to overcome the adverse effects of antibiotics and drugs. These beneficial microorganisms are usually referred as "probiotics", which are capable to colonize and proliferate in the gut of the host and execute numerous beneficial effects by modulating various biological systems of the host [12]. Over the years, a succession of strategies were conducted how to modulate the composition of intestinal microflora for better growth, digestion and immunity. Medical host immunity was investigated in various animals as well as humans [13]. Duration of dosing of probiotics is another important factor which may influence the occupancy of the intestinal tract, persistence and subsequent induction of immune response in the host [14].

2. Materials and methods

The experiment included 52 pheasant chicks. Four groups of thirteen chickens were formed of them. The first group Biopolym, the second group of homeopathy, a third group Lactovita and the fourth a control group. All groups were given feed mixture BŽ from the producer Velas a.s. that did not content anticoccidics. Composition: 36% corn, 32% wheat, toasted soybean extraction meal 10%, wheat bran 10%, fish-flour 4% yeast 2% 2% lucerne flour, ground limestone, 1.2% dicalcium phosphate 0.5% sodium chloride 0.3%, vitamins A, D3, E.

The first group "Biopolym" was administered orally with 40 ml of the hydrolyzate from brown seaweed in water for two weeks daily, the next two weeks only with pure water.

The second experimental group "homeopathics" was given orally 20 ml mixed homeopathics in water for two weeks daily, the next two weeks only pure water.The third group "Lactovita" was

given one tablet of probiotics in water for two weeks daily, the next two weeks only pure water. The fourth group was a control one, the hens were treated standardly with sulfonamide Sulfacox for two weeks and two weeks received only water.

3. Results and discussion

Based on the occurrence of coccidia oocysts in the faeces of pheasants, the results were shown in graphs. The observation period was from 1 July 2012 to 18 November 2012.

In the period from 1 July 2012 to 1 August 2012 none of the groups was infected as a result of an absent source of infection. After this period, the pheasant chicks were moved to outdoor aviaries and were contaminated through the faeces from infected hens. Through the whole time they were given aforementioned bio preparations. After 18 August 2012 the occurrence of coccida oocysts was found in all of four groups.

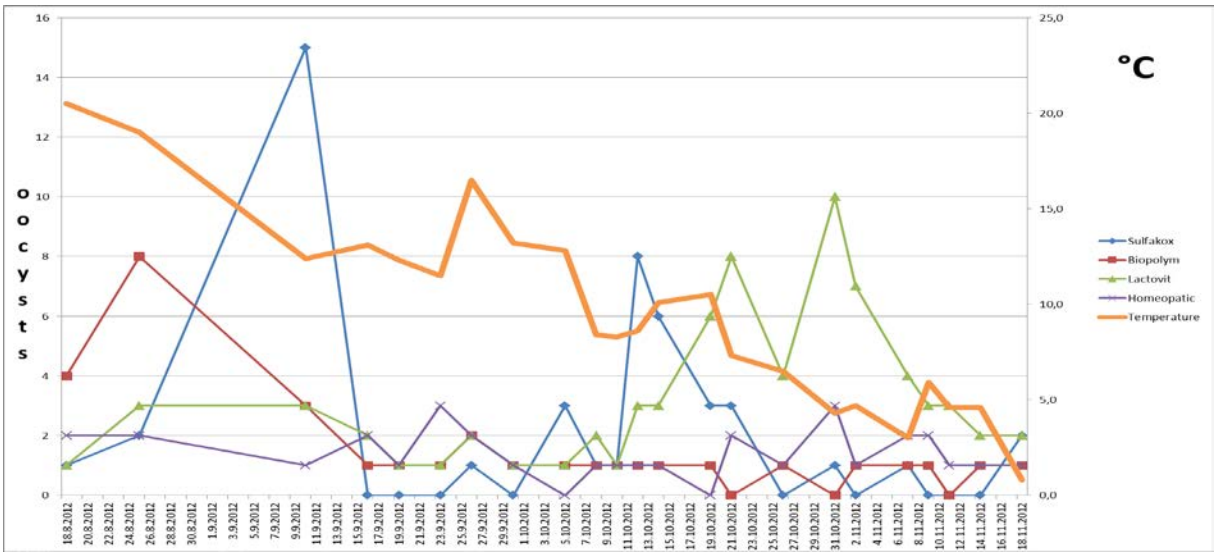

Figure 1. The occurrence of coccidia oocysts in the faeces in the period August 18, 2012–November 18, 2012

In the control group a good functionality of Sulfacox was shown during its administration, but at the same time also relatively rapid occurrence of coccidia oocysts was found in the treatment intervals. In the group Biopolym a beneficial effect of prebiotics administration was shown already during the first administration after infection and lasted until the end of the trial period. These results are equated also with [15], who performed a similar experiment on hen chickens which were given prebiotic Biopolym, too. In the group Lactovita there was no evidence of a beneficial effect of probiotics on the incidence of coccidia oocysts for the reason that the digestive tract of birds apparently contains a different culture of the probiotic bacteria than Lactobacillus sporogenes. Product Lactovita showed beneficial effects on the digestive tract such as in calves [16]. In the group of homeopathics a beneficial effect of homeopathy to reduce the incidence of coccidia oocysts was shown. Their incidence kept on the same level during the whole trial period. The same result was reached by Pazderková [15] with the same homeopatic remedies. The homeopathic product PVB–"vermiformis states" was used. The positive effect of homeopathic remedies on the animal health demonstrated also Rocha et al. [17] in his work, who served homeopathics to sheep.

From the results obtained while receiving preparations Biopolym and homeopathics in the period from 1 July 2012 to 18 November 2012 a beneficial effect on the incidence of coccidia oocysts in the feces of pheasant chicks was statistically demonstrated. Group Biopolym was statistically demonstrated at 10% significance level χ-quadrate (χ=16.28). Group homeopatics was statistically demonstrated at 10% significance level χ-quadrate (χ=12.43). Group Lactovita was not statistically demonstrated neither at 5%, nor 10% significance level χ-quadrate (χ=11.87).

Table 1. Statistical evaluation

	Lactovita x Sulfacox	Homeopatics x Sulfacox	Biopolym x Sulfacox
value χ	11.8788 (df=7)	12.4323 (df=6)	16.2857 (df=9)
value for the surface	5% = 14.07	5% = 12.59	5% = 16.92
value for the surface	10% = 12.02	10% = 10.64	10% = 14.68

4. Conclusions

When testing designated biopreparations a beneficial effect on the incidence of oocysts was demonstrated in two out of three samples. It shows the possibilities for further use in pheasants breeding and it is a promise even for rearing of more resistant individuals and improvement of the overall status of pheasants in natural conditions because the administration of homeopathic and prebiotics appear to promote the creation of natural immunity of reared pheasants. In large-scale breeding of pheasants anticoccidics are often used which although contributing to the breeding of pheasants later released into the wild, at the same time being less capable in terms of developing the natural immunity against infection by different parasites, in our case, coccidia.

These preparations should also gain popularity for other reasons, one of which is a lower purchase price, whether prebiotics and homeopathic remedies. The other reason could be ecological breeding of pheasants and subsequent production of pheasant meat in "bioquality". Also a good functionality of preparation Sulfacox was proved at which administration almost 100% of the oocysts of coccidia were destroyed. At the same time it should be noted that during the treatment breaks rapid resettlement of pheasant´s digestive tract with coccidia occurred and chickens often suffered from strong-smelling diarrhea. This implies that the product Sulfacox has a very good functionality in the digestive tract infection with coccidia, but does not help in creating a natural immunity in pheasant chicks. On the other hand extract from seaweed Biopolym demonstrated a positive influence on the creation of natural immunity during the whole period of feaces testing. Coccidia infection was at very low level and therapeutic breaks did not have any effect on the extent of infection. Homeopathic remedies stabilized numbers of oocysts at a level that did not cause any obvious problems to chickens, faeces were normal and diarrhea did not accured. Also the natural effects were proved, such as temperature and humidity of environment in which the pheasant chickens were reared. It is known that in humid and warm weather the oocysts do well and sporulate easily. On the other hand at low temperatures and in a dry environment sporulation is slow.

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