Growth dynamics of conditionally pathogenic microorganisms \textit{in vitro} under the influence of anthelmintics drugs

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Abstract. The article presents data on the effect of anthelmintic drugs on the degree of growth in conditionally pathogenic microorganisms. Belamizole and aversect-2 were found to have a stimulating effect on the degree of growth intensity of \textit{Staphilococcus aureus} and \textit{Escherichia coli}. In contrast, ivertin has an inhibitory effect on the growth and reproduction of these microorganisms.

1. Introduction

Currently, a close attention is drawn to the fact that some veterinary drugs (anthelmintic) when used can provoke an infectious process. This is due to their side effects on the immune and microbial status of the organism of animals. This is fraught with serious consequences in suppressing the immune system and suppressing the number of beneficial microflora of the gastrointestinal tract of animals, which ultimately may be accompanied by the formation of endogenous spontaneous infections of unknown etiology. As a result, they cause significant damage to livestock breeding associated with the death of animals during anti-invasive measures and the formation of an immunodeficiency state caused by anthelmintics [2]. The clinical picture of outbreaks of individual infectious diseases with economic consequences arises, which requires a timely diagnosis and prevention measures.

Due to the inevitable use of anthelmintics that contribute to the destruction of parasites, the problem of dysbiosis is aggravated. In some animals, a deep dysbiotic change persisted for more than 3 weeks after the use of an antiparasitic drug based on albendazole [1].

In a laboratory experiment, the infection of white mice with Salmonella microbial culture and the simultaneous introduction of anthelmintica Santel caused a large percentage of the death of animals, compared with their infection with Salmonella alone, with a more pronounced pathoanatomical picture [3]. All this necessitates the control of the microbiota of animals during the period of preventive measures (vaccination, anthelmintic treatment) and the development of the means provided for the correction.

In this regard, the need to study the degree of growth intensity of the conditionally pathogenic microorganisms under the influence of anthelmintic drugs in vitro in the prevention of endogenous infections occurs.
2. Materials and Methods
The nature of the growth of the studied microbial cultures under the influence of anthelminthic drugs was determined by sowing them on a meat-peptone agar containing 1% solutions of belamizole, aversect-2, and ivermectin by nephelometry at KFK - 2. Cultures not treated with the test solutions served as controls. The observations were carried out for 48 hours. The cultivation of the strains with the inclusion of anthelmintics in the nutrient medium showed their noticeable influence on the change in the growth pattern of the following microbial cultures: Staphilococcus aureus and Escherichia coli.

3. Results
When studying the growth of the original cultures incubated with anthelminthic preparations, it was established that belamizole and aversect-2 had a stimulating effect on the growth of the microbial culture of S. aureus compared to the control strains (Figure 1, 2).

In microbial culture of S. aureus under the influence of ivermectin, in contrast to the above, the suppression of growth intensity was observed compared with the control strain (without anthelmintic) (Figure 3).
Figure 3. The growth of *S. aureus* under the influence of ivermectin.

In microbial culture of *E. coli* under the influence of belamizole and avermectin, an increase in the number of microbial cells was observed compared with the original strain. These drugs had a stimulating effect on the number of microbial bodies throughout the entire experiment for 48 hours. (Figure 4, 5).

Figure 4. Growth of *E. coli* under the influence of bezamizole.

Figure 5. Growth of *E. coli* under the influence of avermectin.

Under the influence of ivermectin, in *E. Coli* more intensive growth of *Escherichia coli* during the logarithmic phase was observed compared with the control strain. In the control, the growth rate indicator also increased (Figure 6).
4. Discussion
Thus, with therapeutic deworming, belamizole and aversect-2 can stimulate the accumulation of conditionally pathogenic microorganisms, for example S. aureus, E. Coli, and thus trigger the formation of an infectious process as a potential agent. At the same time, ivermectin had a negative effect on the growth of microorganisms.

Consequently, belamizole and aversect-2 can provoke endogenous infection with latent bacterial carriers. Reorganization of the enzymatic process of conditionally pathogenic microorganisms is observed under the action of antiparasitic agents. The restructuring is accompanied by an increase in the level of pathogenicity and invasiveness and the appearance of the risk of spontaneous infectious diseases.

5. Conclusion
The results are of practical importance in the study of conditionally pathogenic microorganisms isolated during bacterial carriage in animals subjected to deworming. In this regard, there is a need to develop preventive measures. These preventive measures would exclude the influence of anthelmintics for the prevention of dysbacteriosis caused by deworming, which may result in spontaneous endogenous infections.

References
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