

Study of comparative antiparasitic efficacy of C-18 compound in cattle nematodiosis and eymeriosis

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Abstract. The comparative antiparasitic efficacy of the compound "C-18," tetramisol granulate, albendazole, diacox, and toltarox in nematodiosis and eymeriosis of cattle has been studied. Studies were carried out on forty calves of 6 months of age naturally infected with nematodiruses and on the same number of animals invaded by eimerias. The preparations were administered individually by mouth. The first group of calves was given a 1% introduction solution of 10% tetramisol granulate, the second group a 10% suspension of albendazole. The preparations were given according to the guidelines for their use. Animals in the third group received a 1% solution of C-18 on sunflower oil at a dose of 2 mg/kg. Group four served as controls. Fecal samples were taken and examined before as well as 7, 15 and 30 days after administration of the preparations. 30 days after dehelminthisation, the intensity and extensity of efficacy of the C-18 compound was found to be 95.0 and 90.0%, versus 82.9 and 60.0% for tetramisol granulate and 90.4 and 80.0% for albendazole. Studies have shown that in cattle nematodiosis, the compound "C-18" is more effective than the known preparations tetramisol granulate and albendazole. A similar pattern is established in the examination of animal feces samples 7 and 15 days after deworming. In the second series of experiments, animals of the first group naturally infected with eimerias were fed diacox by group method at a dose of 1.0 mg/kg, the second - 10% toltarox suspension was administered individually orally at a dose of 0.3 ml/kg, the third - 1% solution of compound "C-18" on salt oil individually orally at a dose of 2.0 mg/kg. Studies have shown that in the case of eymeriosis of cattle, intensity of efficacy in diacox 15 days after treatment was 84.0, toltarox - 88.9, and compounds "C-18" - 88.6%, extensity of efficacy - 50.0 and 83.3%, respectively.

1 Introduction

Among helminthiasis in cattle and small cattle, gastrointestinal channel stronghilatosis is the most widespread. Often these invasions occur without marked clinical signs and veterinary specialists do not pay due attention to the treatment and prevention of these diseases [1, 2]. Among cattle protozooses, eymeriosis is most frequently recorded.

In the fight against parasitic diseases, the main place is taken by etiotropic therapy aimed at killing the agent inside the animal's body. Antiparasitic preparations belonging to different classes of chemical compounds are used for this purpose. They have different chemical composition, different dosage form, as well as different degree of side effect.

Therapy and prevention of helminthosis allows not only to free animals from parasites, but also to protect the environment from contamination by invasive elements [3, 4].

When fighting helminthosis, dehelminthisation is carried out. The given action is carried out by individual delivery to animals of an anti-helminth preparation, or feeding it with fodder, solderin of water to grouped animals [5, 6].

The main criterion in the selection of antiparasitic agents for the treatment of animals is their efficiency and a wide range of activity. Dehelminthisation should be safe and effective for the animal, while completely protecting the external environment from contamination by invasion onset (eggs, larvae, oocysts) [7].

Unlike viruses, bacteria, and fungi that have a primitive protective envelope, many helminths, especially members of the nematode class, have a multi-layered muscle cuticle that is a reliable protective cover. However, parasitic worms have sensitivity to chemicals affecting their motor activity and energy exchange.

One of the main tasks for chemists is directed synthesis of anthelmintic substances combining high selective toxicity for parasites and low toxicity for animals and humans [8–10].

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In the past decade, work has been under way to improve existing antiparasitic drugs and to develop new dosage forms with high bioavailability, low toxicity and a wider spectrum of effects.

2 Material and methods of research

The work was performed in 2018 at the Department of Epizootology and Parasitology of Kazan State Academy of Veterinary Medicine, as well as in agricultural enterprise "Ashyt" in the Arsky District of the Republic of Tatarstan (RT).

The comparative antigelminth efficacy of the compound "C-18" in bovine nematodiosis, which is an onium salt with a higher alkyl substituent, was studied. This compound was synthesized in Kazan Federal University by I.V. Galkina, a professor of the Department of High Molecular and Element Organic Compounds and D.I. Bakhtiyarov, a graduate student of the same department.

This substance is a white powder with a weak specific odor, insoluble in water, soluble in sunflower oil. Temperature of melting is 58.5 °C.

For comparison, tetramisolgranulate and albendazole preparations were taken in the form of a 10% suspension, which were used according to instructions for their use. Intensive and extensive efficacy of the preparations were determined. Samples of excrements at animals were taken individually from rectum and investigated according to Kotelnikov-Hrenov.

The average number of nematodirus eggs and oocysteimerias was calculated by the All-Russian Institute of fundamental and applied parasitology method.

The antieimerios efficacy of the compound "C-18" was studied in comparison with the preparations diacox, toltarox.

Statistical processing of the digital material was performed on a computer using Microsoft Excel.

3 Research results

In the experiment, 40 calves of 6 months of age, naturally infected with nematodyrosis, property of agricultural enterprise "Ashyt" of the Arsk district of the Republic of Tatarstan, were used. Prior to treatment, fecal samples were taken from all animals to determine intensity and extensity of invasion. The animals were divided into 4 groups, 10 animals each.

The preparations were administered individually by mouth. The first group calves was given 1% introduction solution of 10% tetramisolgranulate, the second group – a 10% suspension of albendazole. The preparations were given according to the guidelines of their use. Animals in the third group received 1% solution of C-18 on sunflower oil at a dose of 2 mg/kg. Group four served as controls.

Animals were monitored for 30 days. Fecal samples were taken and examined before and 7, 15 and 30 days after administration. The results of the study of the comparative antigelminth efficacy of preparations in bovine nematodiosis are shown in Table 1.

The table shows that prior to treatment, the intensity of invasion in animals ranged from 136 ± 3.39 to 143 ± 4.89 eggs per 1 g of feces.

Extensiveness in each group was 100.0%. 7 days after deworming, the efficiency of the tetramisolgranulate was 65.5% and the extensiveness was 10.0%.

In animals of the second group intensity of contamination was 32.6 ± 3.77 , intensity and extensity of efficacy of albendazole were 76.0 and 30.0%. The intensity of invasion in the calves of the third group was 19.8 ± 1.92 , the compound "C-18" showed 85.8% intensity of efficacy and 50.0% extensity of efficacy.

In animals in the control group, the invasion rate increased to 145 ± 3.05 nematodirus eggs per 1 g of feces. 15 days after the treatment, the intensity of the calves of the first group, the intensity and extensiveness of the tetramisolgranulate were 28 ± 3.4 , 80.4% and 40.0% respectively.

In animals of the second group, the invasion intensity was 15 ± 5.56 eggs, intensification and extensiveness of albendazole-89.0 and 70%, respectively.

The intensity of the third group calves was 9 ± 1.41 , the intensity and extensiveness of the "C-18" compound were 93.5 and 80.0%, respectively. In animals of control group intensification continued to rise and amounted to 151 ± 2.59 eggs per 1 g of feces.

30 days after the treatment, the invasion intensity in the animals of the first group was 24.5 ± 10.5 eggs of nematodiros, the intensity and extensity of efficacy of the tetramisol granulate - 82.9 and 60.0%, respectively.

The intensification in the animals of the second group was 13.0 ± 1.41 , with the intensification of efficiency and extensibility of albendazole 90.4 and 80.0%, respectively.

Table 1. Comparative antigelminthic effectivity of various preparations in bovine nematodiosis

Group No.	Intensity of invasion before and after treatment (Eggs in 1 g of feces)				Intensity of efficacy, %			Extensity of efficacy, %		
	Before treatment	After 7 days of treatment	After 15 days of treatment	After 30 days of treatment	After 7 days of treatment	After 15 days of treatment	After 30 days of treatment	After 7 days of treatment	After 15 days of treatment	After 30 days of treatment
1	143±4.89	49.4±4.15	28±3.4	24.5±10.5	65.5	80.4	82.9	10.0	40.0	60.0
2	136±3.39	32.6±3.77	15±5.56	13.0±1.41	76.0	89.0	90.4	30.0	70.0	80.0
3	139±3.62	19.8±1.92	9±1.41	7	85.8	93.5	95.0	50.0	80.0	90.0
4	137±3.01	145±3.05	151±2.59	167±2.1	-	-	-	-	-	-

In animals of the third group, the intensity and intensity of efficacy of the compound "C-18" were 95.0 and 90.0%, versus 82.9 and 60.0% for tetramisolgranulate and 90.4 and 80.0% for albendazole.

Thus, in cattle nematodiosis, the compound "C-18" is more effective than the known preparations tetramisolgranulate and albendazole.

In an experiment to study the comparative antieimeriosis efficacy of the "C-18" compound, 24 calves of 6 monthly age, naturally invaded by eimerias, the intensities of which ranged from 102, 0 ± 3.16 to 109, 0 ± 2.01 oocysts in 1 g of faeces, were used. Extensiveness was 100.0%.

Calves were separated by 4 groups. The animals of the first group were fed diacox in a group manner at a

dose of 1.0 mg/kg. Group II calves were prepared individually orally 10.0% a toltarox suspension at a dose of 0.3 ml/kg. The third group animals were individually orally administered a 1.0%

solution of the compound "C-18" on sunflower oil at a dose of 2.0 mg/kg. Group four calves served as controls and were not subjected to antiparasitic treatment.

Fecal samples were taken from animals 7 and 15 days after treatment to determine the intensity of invasion, as well as the intensification and extensiveness of the preparations. The results of the study are shown in Table 2.

Table 2. Comparative anti-emeriosis efficacy of various preparations in cattle emeriosis

Group number	Intensity of invasion before and after treatment (oocysts in 1 g of feces)			Intensity of efficacy, %		Extensity of efficacy, %	
	Before treatment	After 7 days of treatment	After 15 days of treatment	After 7 days of treatment	After 15 days of treatment	After 7 days of treatment	After 15 days of treatment
	102.0±3.16	53.0±2.91	16.3±0.57	48.0	84.0	16.6	50.0
	108.0±2.09	48.0±1.0	12.0±0.71	55.6	88.9	50.0	83.3
	114.0±3.41	37.0±1.0	13.0±0.27	67.6	88.6	50.0	83.3
	109.0±2.01	119.0±2.61	131.0±2.52	-	-	-	-

It can be seen from the table that, 7 days after the treatment, the intensity in calves of the first group was 53.0 ± 2.91, diacox showed 48.0% intensity and 16, 6% extensiveness. In animals of the second group, the intensification was 48, 0 ± 1.0, the intensity and extensiveness of toltarox were 55.6 and 50.0%, respectively. Invasion intensity in calves of the third group was 37, 0 ±

1.0 oocysts in 1 g of feces, compound "C-18" showed 67.6% intensification and 50.0% extensiveness.

15 days after the treatment, the intensification in the animals of the first group was 16, 3 ± 0.57 at the intensification of the efficiency and extensiveness of the diacox 84.0 and 50.0%, respectively. These indicators at animals of the second group were 12.0±0.71, 88.9%,

83.3%, the third - 13.0±0.27, 88.6% and 83.3%, respectively.

4 Conclusion

After 7 days of deworming of calves infected with nematodiosis, 1% aqueous solution of 10% tetramisolgranulitain efficiency and extensiveness of the preparation were 65.5% and 10.0%, 15 days -80.4% and 40.0%, 30 days after treatment 82.9% and 60.0%, respectively.

After deworming the animals 10% suspension albendazolaintense efficiency and extensiveness of the preparation were equal after 7 days 76.0 and 30.0%, after

15 days - 89.0% and 70.0%, after 30 days - 93.5 and 80.0% respectively.

The "C-18" compound showed higher efficacy throughout the study time after deworming. 7 days after deworming Intensification efficiency was 85.8%, extensiveness - 50.0%, after 15 days -93.5% and 80.0%, after 30 days -95.0 and 90.0 respectively.

For the deworming of cattle infected with nematodyrosis, the compound "C-18" at a dose of 2 mg/kg is more effective than the preparations tetramisol granulate and albendazole and can be recommended as an antihelminth agent in the stronghiltoses of the digestive tract of ruminants.

In cattle eymeriosis, the compound "C-18" 15 days after treatment showed 88.6% intensification and 83.3% extensiveness.

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