

INFLUENCE OF ETHAFOS ON ANIMAL ORGANISM

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Abstract:

The use of insecticides against insects has two sides. On the one hand, it is possible to reduce the number of parasites, and on the other hand, insecticides can be excreted with milk, accumulate in internal organs and in blood. Therefore, our task was to study the effect of ethafos on the organism of animals after treatment of livestock premises with 0.3% aqueous suspension of ethafos and use of this preparation in the form of baits. It is noted that after wet treatment of the premises and body of animals there are insignificant changes in blood, as well as traces of drugs in muscles and liver.

Keywords: water emulsion, spraying of body and premises, insecticide baits, traces of drug, internal organs, hemocartin, hemoglobin, leukocytes, erythrocytes, aerosol treatment, zoophilic flies, experimental animals, control animals.

Introduction

Effect of ethafos on the organism of animals after wet spraying of premises.

Among the questions of veterinary entomology the elucidation of the nature of the effect of insecticides on the organism of animals after treatment of premises with preparations against insects is of great importance.

We did not find the results of works on experimental study of ethafos on the organism of farm animals after treatment of premises against zoophilic flies both in foreign and domestic literature. Proceeding from this, we set the task to study the changes occurring in the organism of calves after treatment of premises with 0.3% aqueous suspension of ethafos against flies.

Experiments were conducted on a cattle farm for growing and fattening calves in Okkurgan district of Tashkent region on 5 bull calves of black-breed at the age of 4-5 months (with 5 control calves).

During 5 months after 1.5 and 15 treatments of the premises with 0.3% aqueous suspension of ethafos, every 1; 3; 6; 9; 9; 12; 24; 72; 72; 96; 120; 144; 192 hours, clinical, hematological and biochemical studies were conducted in calves that were in the premises at the time of spraying. At the same time, after the first treatment the body temperature in experimental animals was 38.1-38.4°, pulse - 60-66 beats, respiration - 20-26 movements per min. No depression of the general condition was noted. In 6 hours the blood picture showed: decrease in the number of erythrocytes from 8.2 ± 0.52 to 7.23 ± 0.37 million in 1 mm³, increase in the number of leukocytes from 9.0 ± 0.38 to 10.1 ± 1.2 thousand in 1 mm³, decrease in hemoglobin from



66±1.6% to 64±1.0%. No changes were observed in the number of rod-shaped and segmented neutrophils. In 7 days blood parameters came to the initial level. No clinical and hematologic changes were observed in control animals (Table 14). Both in experimental and control animals there were no sharp changes in the total amount of protein and protein fractions of blood serum. The same results were obtained after 5 and 15 treatments.

When applying baits containing 0.3% aqueous emulsion of ethafos in the premises where experimental animals were located, a slight decrease in the percentage of hemoglobin, erythrocytes and an increase in the number of leukocytes was observed, which was restored to the initial level on the 14th day after discontinuation of the drug application.

Thus, it was found that spraying of premises (in the presence of animals) with 0.3% water suspension and application of baits containing 0.3% water suspension of ethafos do not cause sharp negative changes in the organism of animals.

Table 1 Results of hematological studies of control steers

Number of steers in the trial	Research time.	Erythrocytes you in 1 mm ³ (million)	Leukocytes leukocytes in 1 mm ³ (thousand)	Hemogloo bin Sali %	Basophytes bazophiles %	Eosinophils %
		M ± m	M ± m	M ± m	M ± m	M ± m
5	Before processing.	7.2 ± 0.20	8.5 ± 0.36	55.6 ± 0.66	0.66 ± 0.14	3.14 ± 0.50
	3 h after treatment	7.36 ± 0.50	10.1 ± 1.20	54.7 ± 2.40	0.75 ± 0.25	3.25 ± 0.50
	After 6 h	6.9 ± 0.18	10.2 ± 0.60	55.0 ± 1.00	0.75 ± 0.25	3.75 ± 0.48
	After 192 h	7.23 ± 0.37	8.8 ± 0.13	55.0 ± 1.00	0.75 ± 0.25	4.50 ± 1.04

Neutrophils, %					Lymphocytes %	Monocyte %
	Prolymph. hemocyto-blasts	U	P	S		
	M ± m	M ± m	M ± m	M ± m	M ± m	M ± m
Before processing.	0.08 ± 0	0.08 ± 0	3.8 ± 0.20	21.2 ± 1.40	61.25 ± 3.0	6.5 ± 0.40
3 h after treatment	0.5 ± 0.29	0.25 ± 0	4.5 ± 0.90	20.75 ± 2.90	61.25 ± 3.0	8.5 ± 0.87
After 6 h	0	0	4.5 ± 0.87	21.0 ± 3.00	63.5 ± 4.0	6.0 ± 0.90
After 192 h	0	0	3.5 ± 0.25	20.2 ± 2.05	64.0 ± 2.6	6.7 ± 0.85

Ethafos content in milk of cows after wet spraying of premises (aqueous suspension of the drug).

Taking into account the promising application of ethafos for adult and larval treatments, as well as for treatment of cattle against some ectoparasites, we studied the excretion of ethafos with



milk after spraying of premises in the presence of animals and in the absence of animals against endophilic flies.

Experiments were conducted on 8 dairy cows with 5 controls. The first group of cows (5 heads) was in the room at the time of treatment and after spraying it with 0.3% aqueous suspension of ethafos. There was no forced ventilation.

The second group of cows (3 heads) was driven into the room 2 hours after treatment (rooms) with 0.3% aqueous suspension of the drug, i.e. after establishment of MPC in the working zone air of 0.1 mg/m^3 . During the whole period of the experiment the animals were in the treated room. The treatment was carried out late in the evening after evening milking. During clinical examination, no negative changes in the condition of experimental animals were observed. Milk samples were taken after 1, 12 hours and 1, 2, 3, 5, 7, 13 days. Before taking milk samples, the udder was thoroughly washed with soap and water.

As a result of research it was found that when the premises were treated with 0.3% aqueous suspension of ethafos at a dose of 100 ml/m^2 in the presence of animals, only traces of the drug were observed in milk samples during 3 days; when the premises were sprayed against flies (in the absence of animals), the drug residues were not detected during 13 days.

Consequently, disinsection of premises with 0.3% aqueous suspension of ethafos in the absence of animals does not cause contamination of milk with drug residues during subsequent keeping of cows in the treated barn. When treating the premises in the presence of animals, only traces of the drug were observed during 3 days.

The content of ethafos in meat and internal organs of animals after wet spraying of premises.

Experiments on rabbits. The room with 6 experimental rabbits of chinchilla breed of 2-month old was treated with 0.3% aqueous suspension of ethafos at the rate of $25\text{-}50 \text{ ml/m}^2$ on non-absorbent and $100\text{-}200 \text{ ml/m}^2$ on absorbent surfaces. Animals were slaughtered and sampled for research on 3, 7, 14 and 21 days after treatment. Brain, spleen, liver, kidney, lung and muscle were taken for the study. The drug and its transformation products with anticholinesterase effect were determined by gas-liquid chromatography. The results of the experiments are presented in Table 2.

Table 2. Ethafos content in organs and tissues after spraying of premises with 0.3% aqueous suspension of the drug

Organs and tissues	Ethafos content (mg/kg) at slaughter after (days):			
	3	7	14	21
Brain	0	0	0	0
Heart	0	traces	0	0
Muscles	0	0	0	0
Kidneys	0	0	0	0
Liver	traces	0	0	0
Spleen	0	0	0	0



The table shows that after treatment of premises with 0.3% aqueous suspension of ethafos against endophilic flies, drug residues were not found in meat and internal organs of animals. Traces of the drug were found only in the heart on the 7th day and in the liver on the 3rd day after treatment.

Ethafos content in the air of premises after wet disinfestation.

We conducted experiments to study the content of ethafos in the air after continuous treatment of the premises with 0.3% aqueous emulsion of the drug. Kobrov apparatus was used for air sampling. Pure acetone was poured into the apparatus and air was passed through it.

After treatment of rooms in the presence of calves with 0.3% aqueous emulsion at the rate of 50-200 ml/m², air samples were taken and analyzed by GC method. As a result, in the air of the room in:

2 hours detected 0.1 mg/m³;

6 hours - 0.05 mg/m³;

12 hours - 0.07 mg/m³;

24 hours - 0.0011 mg/m³;

48 hours - 0.0008 mg/m³ of ethafos. After 72 hours, the drug was undetectable in the air sample (Figure 17).

The barn was treated with 0.3% aqueous suspension of the drug. As a result of air sample studies the following parameters were established, after:

2 hours traces of ethaphos were detected;

12 hours - traces of;

24 hours - not detected;

48 hours -"-

72 hours -"-

96 hours -"-

120 hours - not detected

As a result of research it was found that after continuous spraying with 0.3% aqueous emulsion of ethafos in the indoor air drug residues are detected within 48 hours, and after treatment with 0.3% aqueous suspension - within 12 hours (traces).

If we take into account that MPC of ethafos in indoor air is 0.1 mg/m³, then in 2 hours after treatment with water emulsion and water suspension the indoor air becomes harmless for animals. baits not earlier than in 3 hours, i.e. after establishment of MPC of ethafos in the air.

Ethafos content in milk, meat, internal organs of animals after application of the drug in baits.

Experiments were conducted on 10 rabbits of chinchilla breed of 2-4 months of age with a live weight of 2 kg. The possibility of ethafos accumulation in animal meat after application of 0.3% aqueous suspension of the drug in the form of liquid baits for flies during 1 month was studied. The baits were applied in the rabbit housing at the rate of 1 bait per 10^{m2} of floor area.



Drug residues in meat, liver, spleen and lungs were determined 1, 3, 5, 7, 14 and 30 days after insecticide application.

The results of the conducted studies showed that during the whole period (application of baits) of observation in experimental rabbits no symptoms of acetylcholinesterase (AChE) enzyme inhibition in blood were found. However, in muscles and liver of the killed 5 days after ethafos application, its residual amount was found. At that, the pesticide content in muscles was 0.05 and in liver - 0.03 mg/kg. In rabbits killed at the end of the experiment, i.e. 30 days after the beginning of ethafos application, its content in muscles was 0.12 and in liver - 0.2 mg/kg (Table 18).

When discontinuing the application of insecticidal bait, complete liberation of the rabbits' organism from ethafos occurs after 14 days.

When using baits containing 0.3% aqueous suspension of ethafos and 5% sugar, the maximum excretion of the drug with milk of cows was observed in 12 hours from the beginning of the experiment. At the same time, ethafos residues were found in milk after 24 hours in the amount of 0.25 mg/l ($P < 0.01$), after 72 hours - 0.14 mg/l ($P < 0.01$), after 5 days - 0.001 mg/l ($P < 0.01$), after 7 days - 0.009 mg/l ($P < 0.01$). The drug residues were completely absent after 13-14 days.

Thus, it was found that when using baits containing 0.3% aqueous suspension of ethafos indoors, excretion of residual amounts of the drug with milk of cows is observed within 5-7 days. In this regard, the use of insecticidal baits containing 0.3% aqueous suspension of ethafos in premises with the presence of animals, including dairy cows, cannot be recommended.

Conclusions

1. Spraying of premises (in the presence of animals) with 0.3% aqueous suspension and application of baits containing 0.3% aqueous suspension of ethafos do not cause sharp negative changes in the organism of animals.
2. Disinsection of premises with 0.3% aqueous suspension of ethafos in the absence of animals does not cause contamination of milk with drug residues during subsequent keeping of cows in the treated barn. When treating the premises in the presence of animals, only traces of the drug were observed during 3 days.
3. When using baits containing 0.3% aqueous suspension of ethafos and 5% sugar, the maximum drug release with milk of cows was noted in 12 hours from the beginning of the experiment. It was found that after continuous spraying with 0.3% aqueous emulsion of ethafos in the air of the room drug residues are detected within 48 hours, and after treatment with 0.3% aqueous suspension - within 12 hours (traces).
4. If we take into account that MPC of ethafos in the room air is 0.1 mg/m³, then in 2 hours after treatment with water emulsion and water suspension the room air becomes harmless for animals. The drug residues were completely absent after 13-14 days.
5. In premises with the presence of animals, including dairy cows, the use of insecticidal baits containing 0.3% aqueous suspension of ethafos cannot be recommended.



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