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Chemical Method Of Recycling Emulsions Of Some Pesticide.

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ABSTRACT

The article presents the results of experiments on the destruction of pesticides in the emulsion cups of certain medicines used to control ectoparasites of agricultural animals. It is shown that from the several substances possessing the properties of oxidizers or sorption properties, the most suitable were the preparations containing active chlorine - hypochlorite of calcium, sodium, chlorine lime.
Keywords: destruction, utilization, pesticides, calcium hypochlorite

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INTRODUCTION

The use of chemicals at present is one of the main elements of the animal protection system from various ectoparasitic diseases. The world assortment of pesticides, which have found practical application, has about 1000 names. The most widely used is approximately 500 active substances, in the form of 10,000 formulations [1].

In Russia, as in other countries, the methods of disrepair pesticides that have become unusable are implemented: burial [2], burning [3], plasmochemical destruction [4], and also in the case of preconcentration of dilute solutions of potent poisonous substances, adsorption, coagulation and flocculation, which are not universal in terms of protecting the environment from toxic waste. It is established that only a small part of the applied pesticide reaches its place of application and is concentrated in the body the modification of pests. Most of the toxicants used are "useless" as it were, polluting the ecosystem directly during processing, and also as a result of flushing pesticides from animals and plants afterward [5].

The analysis of literature data shows that the most frequently used methods of neutralizing pesticides still remain burial and burning. However, one of the promising can be considered the direction in which detoxification of pesticides is carried out chemically [9].

In the metabolism of pesticides in the environment a certain role is played by hydrolytic photochemical and oxidative processes [6]; [7]; [8].

To combat ectoparasites of agricultural animals, medicinal preparations in the form of aqueous emulsion douches are currently widely used in which animals are bathed or sprinkled. After the treatment, a large number of waste emulsions remain, which contain significant amounts of insect acaricides. The available methods of destroying pesticides, due to their specificity, are not technological for decontamination of the waste emulsion, which requires the development of technologically simple, cheap, labor-intensive methods, without involving complex equipment.

The purpose of this work is the development of a technique for destroying insect-acaricides in used emulsion desserts of various pesticides (WCF, synthetic pyrethroids).

MATERIAL AND METHODS

The study of the effect of chemicals on diazinon, cypermethrin, deltamethrin, and propetamphos in the emulsion desiccants was carried out using calcium hypochlorite, sodium hypochlorite, and sodium hydroxide to destroy them. The sorption properties of the powdery coarse-grained zeolite of the Shivirtui deposit and the fine-grained Chuguevskoye deposit were investigated with the aim of its possible application to remove active substances (DV) from the emulsion cups.

The residual amount of active substances in the selected samples was extracted and investigated by gas-liquid chromatography. Calculation of the degree of decomposition of pesticides was carried out as a percentage of the control sample, in which the amount of pesticide was taken as 100%. For comparison, analytical standard solutions containing 50 µg / ml cypermethrin and 500 µg / ml diazinon, 50 µg / ml deltamethrin, 500 µg / ml propetamphos were used.

Neocidol preparations, creolin, butox, and blocker were used in the work.

For oxidative chlorination used: calcium hypochlorite, neutral, brand "B", containing 30% of the active chlorine. Sodium hypochlorite was produced on an electrochemical small-size installation ELMA-1 with a content of about 1% active chlorine, chlorine lime, grade "A", grade 2 with a content of 23.8% active chlorine. Sodium hydroxide was used for alkaline hydrolysis, h.h. To study the sorbent properties of zeolites: a finely dispersed zeolite of the Chuguev deposit with 86% pure clinoptilolite with a particle size of tanninopomol; large-dispersed zeolite of the Shivirtui deposit.

Production tests for the utilization of emulsions of the studied preparations with calcium hypochlorite (chloride lime) followed by the determination of residual amounts of pesticides in destroyed emulsions by the GLC method were carried out on the basis of the Manihino OPF in the Moscow Region.

RESULTS AND DISCUSSION

Oxidative chlorination of neocidol.

In the study of the deactivating effect of calcium hypochlorite on neocidol - (DV diazinon) in emulsion dessicles, it was found that the destruction of the emulsion begins to manifest itself after 2-3 hours, in samples in which 1.0% and 1.5% of calcium hypochlorite were added. After 3 days, a GLC study was performed to determine the amount of diazinon and the following results were obtained: in sample No. 1 (0.1% calcium hypochlorite), diazinon was 74% with respect to control, i.e. the destruction was 26%. in samples No. 2 (0.5%), No. 3 (1.0%) and No. 4 (1.5%), diazinone was completely destroyed.

Thus, the free chlorine contained in the oxidant has its full effect in the first 2-3 days, because In the subsequent study of samples, changes in the content of diazinon were not detected. Another oxidizer, sodium hypochlorite, did not exert any destructive effect on diazinon. The study of the samples for 10 days did not reveal a noticeable difference in the content of the pesticide in the tested samples with respect to the control.

Alkaline hydrolysis of neocidol.

Sodium hydroxide revealed a high degree of destruction of the pesticide. When adding hydroxide to the emulsion in an amount of 0.5-1.5% diazinon in the samples was not found at all times of the study. When 0.1% was added after 7 days, diazinon was destroyed by 80%. After 10 days, diazinon in the sample was not detected.

However, sodium hydroxide is an expensive chemical, so its use in large quantities for the purpose of decontamination of the emulsion cups will not be cost-effective.

Study of sorbent properties of zeolites for purification of the emulsion from diazinon.

When studying the sorbent properties of finely dispersed zeolite (Chuguevskoye deposit) and coarse-grained (Shivirtuinsky deposit), there was no significant difference in the manifestation of sorption properties and purification of emulsions from diazinon. In the study of GLC samples after 3 days, both zeolites adsorbed the pesticide by 40-45% regardless of the amount applied (from 0.1% to 1.5%).

Oxidative chlorination of creolin.

When applying creolin calcium hypochlorite 0.1% in the emulsion, cypermethrin degrades to 2.4 μg / ml (4%). When the concentration of calcium hypochlorite is increased to 0.5-1.5%, cypermethrin degradation occurs to "trace" residues (0.2% -0.3%), which corresponds to 0.124-0.378 μg / ml, with its content in the control sample 59.336 μg / ml.

Thus, calcium hypochlorite in 0.5% concentration destroys cypermethrin up to 0.00002%, which is 300 times less than in the control. Sodium hypochlorite is less active in the destruction of cypermethrin - after 3 days it remains 15%, after 10 days - 12%.

Alkaline hydrolysis of creolin.

In the study of the destructive action of sodium hydroxide, data have been obtained that indicate its weak effect on cypermethrin in the emulsion of creolin. Thus, at a concentration of 1.5% sodium hydroxide on day 3, a residual amount of cypermethrin 37.5% was detected, after 6 days - 34.7%, after 10 days - 23.3%, relative to the control. The obtained results of the study make it possible to conclude that the use of this chemical as a disintegrant is ineffective.

Study of sorbent properties of zeolites for purification of creolin emulsion.

The investigated zeolites gave practically no positive results for their possible use in order to purify the cream emulsion creosins. The residual amount of cypermethrin in all samples remained at least 70-80%, relative to the control sample.

Oxidative chlorination of butox.

Oxidative chlorination of a butox beaker emulsion containing 0.005% LW to destroy deltamethrin was carried out by adding calcium hypochlorite in an amount of 0.05 to 1%. In the study of GLC samples, in spite of the complete destruction of the butox emulsion, the residual amount of deltamethrin was 23.2 and 8.3 µg / ml with the addition of 0.5% and 0.75% calcium hypochlorite, respectively. The complete destruction of deltamethrin occurred when 1% calcium hypochlorite was added to the volume of the emulsion dome.

Oxidative chlorination of the block.

When exposed to calcium hypochlorite emulsion (3%), the number of propetamphos decreased from 0.2 to 0.06%. It has been established that propetamphos is more difficult to decompose by means of oxidative chlorination and depends on the quantitative content of calcium hypochlorite and active chlorine.

Destruction of diazinon and cypermethrin in emulsions of neocidol and creoquine after bathing sheep.

Bathing of sheep in the emulsion of neocidol was carried out in a bath with a capacity of 250 liters. The bath was filled with water in an amount of 150 liters and the concentrate of the emulsion of neocidol was dissolved in an amount of 52 ml (working emulsion 0.02% by LW). After the purchase of 3 sheep, calcium hypochlorite was added to the remaining emulsion in an amount of 0.5% to the volume of 650 g. Samples for analysis were taken before the sheep were bought, after the purchase and 2 and 7 days after the application of calcium hypochlorite.

The emulsion was destroyed in two days completely. In the supernatant after 2 and 7 days, diazinon was not detected by the GLC method. After mixing the supernatant and the precipitate, samples were also taken after 2 and 7 days for examination. After 2 and 7 days, 1.6 µg / ml of diazinon were found in the mixed sample, which was 0.0007%.

Thus, the disrupted chelating emulsion of neocidol after 2 and 7 days in the supernatant does not contain diazinon, and the sediment contains a certain amount of acrylic, the content of which after mixing with the supernatant is. 0.0007% (traces).

Studies with creolin were conducted under similar conditions. Working emulsion is 0.005% by LW. For destruction, 625 g of bleach was added to the remaining emulsion (0.5% by volume). Samples for analysis were taken before the cup, after the cup, 2 and 7 days after the application of bleach. After 2 days, the destroyed emulsion contained 0.00002% cypermethrin. Seven days after the shattered emulsion was mixed and the film deposited on the bottom, 5.2 µg / ml of cypermethrin was contained in the sample, which was 0.0005%. The obtained data indicate that the courageous emulsion of Creoquine after oxidative hydrolysis is destroyed in 2 days to the "trace" remnants of cypermethrin, but a part of undiluted cypermethrin is contained in the resulting surface film.

Destruction of deltamethrin in the butox emulsion after sheep bathing.

To destroy deltamethrin, 1% of bleach was added to the remaining emulsion after bathing the sheep. As a result of the studies, it was found that after 2 days the emulsion contained 0, 00005% deltamethrin after 7 days deltamethrin was not detected. The data obtained indicate the destruction of deltamethrin to "trace" residues after 2 days and complete destruction after 7 days.

Utilization of propetamphos after sheep bathing in the emulsion of the blot.

For the destruction of propetamphos in the emulsion after bathing 3 sheep calcium hypochlorite was added at the rate of 0.5%. Samples were taken for analysis before bathing the sheep, after bathing, 2 and 7 days after the application of calcium hypochlorite. The obtained chromatographic data indicate the destruction of propetamphos to 0.0017% after 2 days and to 0.0002% after 7 days, before destruction - 0.012%.

CONCLUSION

Laboratory and industrial studies on the destruction of ED of the cupful emulsions of neocidol, creolin, butox, and blocker with various chemical substances have established that the greatest effect is achieved when oxidizing them with chlorine hypochlorite or chlorine lime. When calcium hypochlorite is applied at a concentration of 0.5-1% to the volume of the emulsion of neocidol, kreohin, butox or blot after the dinasin sheep is bought in them, the content of cypermethrin is 0.00002-0.0001%, deltamethrin, 0.00005 %, a block of 0.0002%

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