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Hygienic aspects of the possibility of using the new insecticide Seller in agriculture

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***ABSTRACT**--The purpose of this study was to identify the danger of an insecticide.Seller is 20% ks for humans and to develop, taking into account the specific features of agriculture in Central Asia, regulations that guarantee its safety in the environment and for consumers of agricultural products in hot climates.*

***Keywords**—Hygienic, insecticide, agriculture, Seller*

I. INTRODUCTION

According to the results of toxicological studies, it was found that the Seller preparation of 20% k.s. belongs to hazard class III (SanPiN RUz No. 0321-15). The insecticide has an irritating effect on the mucous membranes of the eyes and skin. The drug has functional cumulation.

The permissible daily dose at the level of 0.72 mg (people) per day is scientifically substantiated. Seller 20% K.s. does not have carcinogenic, mutagenic and embryotoxic effects.

Based on the complex of studies, hygienic standards of the preparation were developed and recommended: maximum concentration limit in water of reservoirs at the level of 0.04 mg / l (limiting hazard indicator is organoleptic); MPC in the air of the working area - 0.24 mg / m³; MPC in atmospheric air - 0.002 mg / m³; MDU in wheat - 0.18 mg / kg; UEC in the soil - 0.2 mg / kg sanitary protection zone (C33) - 200 meters, time for going to work after 7 days.

Thus, on the basis of the above, the insecticide Seller 20% k.s. can be recommended for use in agricultural practice, subject to the mandatory use of personal protective equipment for eyes, skin, respiratory organs and compliance with the rules for the use of the drug, recommended consumption rates and safety measures when working with pesticide.

Relevance: The problem of chemical plant protection products attracts increasing attention not only of working agricultural, chemical and medical sciences, but also of the general public. This is evidenced by numerous publications in world literary scientific journals and books (Melnikov N.N. 1994, Golagonov P.S. 2004, Rakhmanin Yu.A. 2013. And others. The problem of protecting public health in connection with the widespread use of pesticides worries many hygienists countries (Sarkisova A.G. 2000, Melnikov N.N. 1994., Rakhmanin Yu.A. et al. 2013).

First of all, this is a general hygiene, large-scale, complex and multifaceted problem. To protect cultivated plants from numerous pests and pathogens, as well as from weeds, a significant assortment of chemicals used to

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control agricultural pests is used. All these substances of the aggregate and each separately are intended for the destruction of harmful organisms.

Some chemicals are very persistent; they retain their toxic properties under natural conditions for a long time. Some of them have carcinogenic, mutagenic, gonadotropic and other negative effects on public health (Iskandarov T.I. et al. 2016). Therefore, the study of toxic, carcinogenic, mutagenic and other properties of pesticides is of paramount importance.

The hygienic substantiation of the standards for the permissible content of pesticide residues in the environment, as well as the regulation of the conditions for their use, taking into account the whole variety of factors determining the duration of conservation of these chemicals in nature, are the basis of the system for the prevention of their possible adverse effects on humans (A. Labyntsev et al. ., 2010, Belan S.R. et al., 2011).

According to the sanitary legislation, not a single chemical substance can be approved for use in the national economy without a deep toxicological and hygienic assessment (Law of the Republic of Uzbekistan on the sanitary and epidemiological well-being of the population-2015).

Among pesticides used in agriculture, insecticides occupy a special place. Of these, synthetic pretroids are widely recognized for the most part, relatively low toxicity for warm-blooded organisms with a single exposure, but are highly resistant to the environment (Goldstein N.I. 2001).

The latter feature determines the possibility of their migration in soil, food products moving in ecological and food chains, the final link of which is man.

In this regard, and also considering that certain groups of this class are characterized by embryotoxicity, mutagenicity, and other manifestations of biological activity (Iskandarov T.I.-2016, Teyvan R.Ya.-2002). The introduction of pesticides of derivatives of synthetic pretroids into agricultural practice should be accompanied by a comprehensive study of them and strict regulation.

The high insecticidal and economic effectiveness of plant protection chemicals stimulates the search for new pesticides of the class of synthetic pretroids.

As a result of such searches, a new, promising insecticide “Seller 20% cop” was created. To solve the question of the possibility of using it in areas designated for food crops and developing appropriate preventive regulations, there was a need for toxicological and hygienic assessment of this drug, which is included in the plan of the coordination Council of the Ministry of Health of the Republic of Uzbekistan (protocol No. 2 of February 20, 2019)

II. PURPOSE OF THE STUDY

Our goal is to assess the danger to Seller of 20% k.s. for humans and to develop, taking into account the specific features of agriculture in Central Asia, regulations guaranteeing safety in the environment and for consumers of agricultural products in hot climates.

III. THE OBJECTIVES OF THE STUDY

1. To determine the main parameters of Seller toxicity of 20% k.s. for warm-blooded animals with single and multiple administration, necessary for the development of hygiene regulations, to study the nature and features of the action on individual organs and systems.

2. Give a comparative description of the studied insecticides and synthetic drugs already used, taking into account their chemical structure and biological activity, determining the location of the insecticide Seller 20% K.s. in a row of insecticides.

3. Develop hygiene regulations that ensure safety for the environment and humans.

The scientific novelty of the work lies in the fact that for the first time a multifaceted study was conducted on the toxicological and hygienic assessment of a new, promising insecticide - Seller 20% c.s. and a set of hygienic regulations have been developed that ensure its safe use in agriculture, taking into account factors characteristic of soil and climate conditions of Uzbekistan and other Central Asian Republics (soil type, irrigation conditions, etc.).

IV. THE PRACTICAL SIGNIFICANCE OF THE WORK

1. The maximum permissible concentration (MPC) of the drug in the atmospheric air, air of the working area and in the water of water bodies has been developed

2. Justified: approximate safe concentration (UEC) of Seller 20% c.s. in the soil, the maximum allowable level (MRL) in food products;

3. Identified characteristic changes in the functional state of individual body systems arising under the influence of Seller 20%, which can be used to develop methods for the diagnosis and treatment of poisoning with this drug.

4. Methodological recommendations will be drawn up on the use of the seller's insecticide 20% k.s. on special soils of the Republic of Uzbekistan and identical conditions of the Central Asian republics.

The theoretical significance of the work lies in the fact that some aspects of the pathogenesis of the toxic effect of Seller 20% on the organism of warm-blooded animals are established. The regularities of the behavior of the insecticide in the soil and climatic conditions of Uzbekistan have been identified, which should be taken into account when hygienically regulating the conditions for its use.

V. OBJECTS AND RESEARCH METHODS

The object of the study was the insecticide Seller 20% K.s. productions of LLC Euro-Team, Uzbekistan-Germany. The name of the active substance is alpha-cyano-3-phenoxytenzyl (2,2-dichlorvinyl) -2,2-dimethylcyclopropane-carboxylate. Chemical class - synthetic drugs, purpose - insecticide.

VI. SCOPE - ON WHEAT AGAINST HARMFUL TURTLES, LEECHES.

Seller 20% c.p. - non-systemic insecticide of contact and abdominal action with a pronounced residual effect on the treated plants. - non-systemic insecticide of contact and abdominal action with a pronounced residual effect on the treated plants.

The preparative form of the drug. The state of aggregation is a suspension concentrate, white (light cream) in color with a faint chemical smell. The drug is not volatile, not explosive, does not have corrosive properties.

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The toxic effects of Seller 20% xs were studied in sexually mature animals of both sexes (white mice and chris) rabbits. Previously aged in laboratory mode, when introduced into the stomach in the form of an aqueous emulsion by a probe under the conditions of acute, subacute and chronic experiments. At the same time, the skin-irritating and allergenic effects of the drug in white rats were studied by applying to clipped skin, introducing the native drug into the conjunctival sac. When studying the toxic effect and degree of Seller toxicity, 20% of cc took into account the following indicators: animal survival, behavior, general condition, body weight, time about symptoms of intoxication and animal death.

Thus, the study of the toxicity of the drug was carried out according to the methodological manual "Methodology of integrated and accelerated rationing of pesticides in environmental objects." Approved by the Ministry of Health of the Republic of Uzbekistan on April 10, 2014 for No. 8N-P / 193

VII. THE TOXICITY PARAMETERS OF THE DRUG

(Own research)

The study of acute toxicity of the drug was carried out in laboratory animals - rats. Rats of both sexes were taken into the experiment, to which the drug was administered in doses of 50.0 - 500.0 mg / kg. As a result of the studies, an average - lethal dose was established at the level of 300.0 (204.0 ± 395.0) mg / kg body weight, LD16 - 120.0 mg / kg; LD84 - 440.0 mg / kg (tab. 1). The poisoning clinic manifested itself as follows: the animals became lethargic, nasal discharge, increased salivation, shortness of breath, animals took a lateral position, after which clonic convulsions were noted.

Table 1: Calculation Establishment of Acute Acute Toxicity Parameters

Dose mg / kgXэ	Mortality, % Yx	Dose location, X	Pierced Y	Weights Coef т B	X B	X2B	YB	XY
50,0	0	0,5	3,27	1,6	0,8	0,4	5,23	2,9
100,0	16,6	1	4,01	3,5	3,5	3,5	14,04	14,04
200,0	33,3	2	4,56	4,5	9,0	18,0	20,52	41,0
300,0	50	3	5,0	5,0	15,0	45,0	25,0	75,0
400,0	66,6	4	5,41	4,6	18,4	73,6	24,89	99,3
500,0	100	5	6,73	1,6	8.0	40,0	10,77	53.3
		∑		20,8	54,7	180,5	100,45	286,3

Thus, according to the parameters of acute toxicity, the drug belongs to hazard class III, according to SanPiN RUz No. 0321-15 “Hygienic classification of pesticides by toxicity and hazard”.

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VIII. IRRITATING EFFECT OF THE DRUG

EYES.

The experiment was performed on white rats. The drug was introduced in the native form into the conjunctival sac of the animal's eye in an amount of 2–3 drops, the second eye served as a control. 1 hour after application, redness and lacrimation were observed in the experimental eye of the animal. 4 hours after application, slight suppuration, blepharospasm was noted. On the 3rd day, the observed signs of irritation (conjunctivitis) tended to decrease and disappeared on the 4th – 5th day of the experiment. Based on the studies, we can conclude that the drug has an irritating effect on the mucous membranes of the eyes.

LEATHER.

The experiment was carried out on experimental animals - white rats. The preparation was applied to the clipped skin in the native form, after a 4-hour exposure, the preparation was washed off and observations were made of the experimental skin areas. Immediately after application, redness, swelling, and single cracks were observed in the test areas. Observed signs of irritation were noted for 3–4 days; by day 5 of the experiment, there were no signs of irritation.

Thus, the drug has an irritating effect on the skin.

The study of the cumulative properties of the drug Seller 20% K.s.

The cumulative properties of the drug were studied under the conditions of a subchronic (4 month) experiment on white rats, which were divided into 2 groups. The first group received the drug at a dose of 1/10 LD50 (30 mg / kg). The second group served as control. Due to the absence of animal death, the cumulation coefficient was not possible to calculate. However, according to the manifestation of some signs of intoxication (agitation after drug administration), it can be concluded that the drug has weak functional cumulation.

The study of chronic toxicity of the Seller 20% K.s.

The study of the chronic toxicity of the drug using mathematical modeling made it possible to establish the threshold and inactive dose at the levels of 3.0 and 0.6 mg / kg, respectively. The allowable daily dose of the drug is calculated and scientifically substantiated at the level of 0.72 mg / person / day.

The long-term effects of the drug were studied during a two-year experiment in rats. The experimental animals were divided into 5 groups

I gr control

II g was administered 1 mg / kg of the drug

III gr was administered 10 mg / kg of the drug

IV g was administered 100 mg / kg of the drug

V gr was administered 1000 mg / kg of the drug

When experimenting for 2 years, a carcinogenic effect of the drug was not detected. The number of neoplasms in the experimental groups of animals did not exceed the spontaneous level of control. Signs of thermotogenicity, embryotoxicity, and mutagenicity were also not observed.

Thus, the insecticide Seller 20% K.s. It has no carcinogenic, teratogenic, embryotoxic and mutagenic effects.

IX. JUSTIFICATION OF THE MPC OF THE DRUG IN WATER BODIES OF WATER

In order to establish the MPC of the drug in the water of reservoirs, studies were conducted to study the effect of the drug on the organoleptic properties of water and the sanitary regime of water in reservoirs. According to the effect on the organoleptic properties of water (odor), a threshold concentration of 0.04 mg / L has been established. The drug in this concentration did not have foaming, did not change the color of the water. Given the results of the sanitary - toxicological experiment, a threshold concentration of 0.72 mg / l has been established.

The complex of studies, taking into account the data of the sanitary-toxicological experiment, allowed us to recommend the maximum concentration limit of the drug in the water of reservoirs at the level of 0.04 mg / l, the limiting sign of harmfulness is organoleptic.

X. JUSTIFICATION OF THE MDA OF THE DRUG IN FOOD

Based on the data on the stability of the drug, toxicometric parameters, guided by the generally accepted hygienic approaches to rationing pesticides in food products, the recommended MDA of the drug is: in wheat - 0.18 mg / kg. However, taking into account the minimum consumption rates of the preparation - 0.05 l / ha, there should be no residual quantities of the preparation in wheat.

The rationale for the MPC of the drug is 20% C.s. in atmospheric air and air of a working zone

Based on methodological approaches to the regulation of harmful substances in air (2014 methodology, SanPiN of the Republic of Uzbekistan No. 0293-11), taking into account toxicological parameters and its physicochemical properties, the maximum concentration limit of the drug in atmospheric air at a level of 0.002 mg was substantiated and recommended. / m3, in the air of the working area - 0.24 mg / m3.

Justification of the approximate permissible concentration (UEC) of the Seller's drug 20% k.s. in the soil

When calculating the approximate permissible concentration (OEC) of the drug in the soil, we were guided by the methodological manual “Methods of integrated and accelerated rationing of pesticides in environmental objects -2014”

The calculation was based on MDU data of the drug in plant foods. Recommended ODK of the drug in the soil at the level of 0.2 mg / kg.

XI. FINDINGS

Based on the conducted experimental studies and expert examination of the documentation provided by the company, it was found:

Seller 20% c.p. - non-systemic insecticide of contact and abdominal action with a pronounced residual effect on the treated plants. The drug exhibits an action against eating. Scope - on wheat against harmful turtles, leeches. Insecticide affects the intestinal tract and nervous system of insects. The action appears immediately after treatment within the first hour. The protective period is one full season. Spraying - during the growing season. The term of the last processing before harvesting is 15 days.

According to the parameters of acute toxicity, the drug belongs to hazard class III (SanPiN RUz No. 0321-15). A study of the effect of the drug on the mucous membranes of the eyes of experimental animals made it possible to establish that the drug has an irritating effect on the mucous membranes of the eyes and skin.

A study of the cumulative properties of the drug made it possible to establish that the drug has poorly functional

XII. CUMULATION

The permissible daily dose at the level of 0.72 mg / person / day is scientifically substantiated. The insecticide Seller 20% K.s. does not have carcinogenic, mutagenic, embryotoxic effects.

Based on the complex of studies, hygiene standards of Seller were developed and recommended 20% k.s: MPC in the water of reservoirs at the level of 0.04 mg / l (the limiting sign of harmfulness is organoleptic); MPC in the air of the working area - 0.24 mg / m3; MPC in atmospheric air - 0.002 mg / m3; MDU in wheat - should not be; ODK in the soil - 0.2 mg / kg.

Sanitary protection zone (SPZ) - 200 meters; deadlines for work - 7 days.

Thus, based on the foregoing, the insecticide Seller 20% K.s. can be recommended for use in agricultural practice subject to the mandatory use of personal protective equipment for eyes, skin, respiratory organs (irritates the eyes and skin) and compliance with the rules for the use of the drug, recommended consumption rates and safety measures when working with pesticides.

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