

## MODERN HYGIENIC PROTECTION ISSUES ENVIRONMENT AND PUBLIC HEALTH WHEN USING UNI-AGRO FERTILIZER

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**Abstract:** The toxicity of the highly effective, fast-acting fertilizer "Uni-Agro" was studied. The hygienic standards of the drug in environmental objects are scientifically substantiated. On the basis of the conducted studies, the permissible daily dose (ADD) for a person was calculated and scientifically substantiated at the level of 1.2 milligrams per person per day. It is recommended: maximum permissible concentration (MAC) of the drug in the water of reservoirs - 0.4 milligrams / liter, in the air of the working area at the level - 3.0 milligrams / cubic meter, in atmospheric air - 0.2 milligrams / liter cubic meter. It has been established that Uni-Agro fertilizers, in terms of toxicity, belong to the IV hazard class (low-toxic compounds).

**Keywords:** mineral fertilizer, toxicity, average lethal dose, irritating effect, hygienic standard, environment, regulation, safety, air, water, soil.

Over the past decades, there has been a steady increase in global demand, production and use of pesticides and fertilizers. Cumulative global sales continue to increase by about 4.1 percent per year and are projected to reach \$309 billion by 2025. Demand for crops, goods and services drives the production and use of pesticides and fertilizers. The main driving force is the growing demand for food. Fertilizers provide some benefits, but current and projected production and use, as well as lack of effective regulation, are associated with a range of negative environmental and health impacts throughout the life cycle of fertilizers. This cannot be recognized as an environmentally sustainable practice. The negative impact of fertilizers is mainly due to their excessive and inefficient use. It leads to the release of nutrients into the environment and other negative effects, such as pollution of drinking water and eutrophication of freshwater systems and coastal areas. Some fertilizers also affect people's lives as a result of unsafe storage and application methods [1].

In this regard, we have carried out comprehensive studies to study the parameters of toxicity and hygienic regulation of the highly effective, fast-acting Uni-Agro fertilizer containing, in addition to the nutrients nitrogen and phosphorus, macro- and microelements (sulfur and copper) in a completely digestible form. All nutrients are in solution, so they are easily available to plants. The fertilizer is highly effective in sowing any crops, on all types of soils [3].

**Research methods.** When conducting research, hygienic, toxicological, biochemical and statistical methods were used. The studies were carried out in accordance with the "Methodology for the comprehensive and accelerated regulation of pesticides in environmental objects", the degree of toxicity and danger was determined in accordance with the Sanitary Rules and Norms No. 0321-15 "Hygienic Classification for Toxicity and Hazard" [2 , 4, 5].

**Results and discussion.** The establishment of acute toxicity parameters is an integral part of complex toxicological and hygienic studies. In order to establish the average lethal dose of the drug,

studies were conducted on white rats of both sexes. Animals were injected with the drug in doses from 1000.0 to 7000.0 mg/kg of animal body weight. The mean lethal dose of the drug was calculated by the least squares method (Prozorovsky V.B.). As a result of the research and mathematical calculations, the average lethal dose (LD50) was established at the level of 4375.0 (3527.3 ÷ 5222.7) milligram/kilogram. To establish the average lethal dose (LD50) in white mice, doses from 2500.0 to 5500.0 milligrams/kg of animal body weight were taken.

The average lethal dose (LD50) was set at 4100.0 (3777.1 ÷ 4472.9) milligram/kilogram. The Dehman Le Blanc method established the average lethal dose (LD50) for rabbits at 4900.0 milligrams/kilogram. Throughout the entire observation period (14 days) in toxic doses, it was noted: after the administration of the drug, increased activity and snorting were noted; an hour after the injection - oppression of experimental animals, respiratory failure, lateral position were also observed. The conducted experimental studies indicate that the drug belongs to substances of hazard class IV - low-hazard compounds (Sanitary rules, norms and hygienic standards of the Republic of Uzbekistan No. 0321-15 "Hygienic classification of pesticides by toxicity and danger"), not has visual sensitivity.

*Irritant effect of the drug on the mucous membranes of the eyes.* Experimental studies on the effect of the drug on the mucous membranes of the eyes were carried out on white rats, in the right eye of which the drug was introduced in its native form, the left eye served as a control. Observations were carried out in dynamics after 1-4 hours, 1-5 days for experimental animals. After the introduction of the drug, the animals actively scratched their eyes with their paws. After an hour later of introducing the drug, the animals showed slight edema and narrowing of the palpebral fissure. After 3 hours from the beginning of the experiment - hyperemia of the conjunctiva. Fully observable signs of irritation disappeared 24 hours after application. Conclusion: the drug has a slightly irritating effect on the mucous membranes of the eyes.

*Irritant effect of the drug on the skin.* The local skin-irritating effect of the drug was studied on white rats, which were subjected to the application of the drug on the trimmed areas of the skin in the abdomen (in its native form). After a 4-hour exposure, the drug was washed off with running water and the experimental skin areas were observed. The results of the study showed the presence of moderate hyperemia and edema of the experimental areas. After 24 hours from the start of the experiment, there were no observed signs of irritation. Thus, the drug has a slightly irritating effect on the skin.

*The study of the possible cumulative effect* of the drug was carried out by the method of sub chronic toxicity. In the experiment were taken white rats, which were divided into 2 groups. Group 1 received the drug at a dose of 1/10 of the maximum administered dose, the second group served as a control. During the experiment, there were no signs of intoxication, death of animals, however, a decrease in the activity of experimental rats was observed. Due to the lack of death of animals, it was not possible to calculate the accumulation coefficient. Based on the above, we can conclude that the drug has a weakly expressed functional accumulation. The toxicity parameters are presented in the table.

Table

**Toxicity parameters of Uni-Agro fertilizer  
for warm-blooded animals**

<b>№ n/n</b>	<b>Indicator</b>	<b>Value (milligram/kilogram)</b>
1.	Average lethal dose (LD50,): - white rats - white mice - rabbits	4375,0 4100,0 5900,0
2.	Local skin irritant effect	slightly annoying
3.	Irritant effect on the mucous membranes of the eyes	slightly annoying

4.	Cumulative Properties	weakly expressed functional nature
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The study of the chronic toxicity of the drug, using mathematical modeling methods, made it possible to establish the threshold and maximum inactive doses of the drug at the level of 10.0 and 1.0 milligrams/kilogram. Based on the maximum inactive dose, the permissible daily dose (ADD) for a person was calculated and scientifically substantiated at the level of 1.2 milligrams per person per day.

*Hygienic standards of the drug in environmental objects and food products.* Many pesticides used in agriculture, when released into the water of reservoirs, can degrade the organoleptic properties of water, giving it an unpleasant odor and taste. It has been established that the drug, when it enters the water, gives it a specific smell, taste and color (blue color). The study of the effect of the drug on the organoleptic properties of water was carried out with concentrations from 0.1 to 10.0 mg/liter. According to the majority of odorators, the odor threshold (1 point) at 20°C is 0.5 milligram/liter; the practical threshold is 1.0 milligram/liter. The results of statistical processing showed that the threshold of odor perception is 0.40 milligrams/liter; the practical limit is 0.80 milligrams/liter. A graphical method for evaluating the data made it possible to establish that the intensity of odor in water increases in proportion to the logarithms of their concentrations, i.e. the received data obey the Weber-Fechner psychophysiological law. The odor perception threshold was set at 0.46 milligrams/liter. The results of the experiment made it possible to set the taste sensation threshold according to the majority of tasters at the level of 1.0 milligrams/liter, the practical limit is 2.0 milligrams/liter. Taking into account that the drug gives the water a blue color, the establishment of the threshold concentration by the effect on the color of the water was carried out by successive dilutions of the initial solutions with different concentrations of the substance. By dilution, the concentration of the drug was established, which did not impart color to the water, visible in a column 10–20 centimeters high (using Gener's cylinders), which turned out to be 10.0 milligrams / liter. Thus, the study of the effect of the drug on the organoleptic properties of water made it possible to establish that the limiting sign of harmfulness is the effect of the drug on the smell of water; the threshold is 0.4 milligrams / liter. Influence of the drug on the sanitary regime of water in reservoirs. The study of the effect of the drug on the processes of water self-purification by creating model reservoirs in aquariums was carried out for 30 days, for 20 days the dynamics of changes in biochemical oxygen demand (BOD) was observed, and for 30 days - mineralization processes. When carrying out these experiments, particular importance was attached to the dynamics of biochemical oxygen demand (BOD), as the 1st phase of mineralization of the substance, corresponding to the process of carbon and hydrogen oxidation. When studying the effect of the drug on the dynamics of biochemical oxygen demand (BOD), a series of experiments were carried out with concentrations of 0.04; 0.4 and 4.0 milligrams/liter. A concentration of 0.04 mg/liter did not cause changes in biochemical oxygen demand (BOD), and a concentration of 0.4 mg/liter caused an increase in biochemical oxygen demand (BOD) by 10–14%, which was taken as the threshold for the effect on biochemical oxygen demand (BOD). In the above concentrations, the effect of the drug on the processes of the second phase of mineralization, water pH and the death of saprophytic flora was studied. Thus, on the basis of the conducted studies, taking into account the data of the sanitary-toxicological experiment, it is recommended that the maximum permissible concentration (MPC) of the drug in the water of reservoirs be at the level of 0.4 milligrams / liter (the limiting sign of harmfulness is organoleptic).

Based on generally accepted approaches in hygienic practice to the hygienic regulation of chemicals in the air, using calculation methods according to equations based on the correlation of the drug and its toxicity, the following are recommended: the maximum allowable concentration (MPC) of the drug in the atmospheric air is 0.2 milligrams / cubic meter, in the air of the working area - 3.0 milligrams / cubic meter. Mineral fertilizers in food products of plant origin and in the soil are not standardized.

#### **Conclusion:**

As a result of the research, it was found that the drug, according to the parameters of acute toxicity, belongs to the IV hazard class (low-hazardous compounds): it has a slightly irritating effect on the skin and mucous membranes of the eyes; cumulative properties are weakly expressed, of a functional nature. The complex of conducted studies made it possible to recommend hygienic standards and regulations for the use of the drug: the permissible daily dose (ADD) for a person is 1.2 milligrams per person per day; the maximum permissible concentration (MPC) of the drug in the water of reservoirs is 0.4 milligrams / liter, in the atmospheric air - 0.2 milligrams / cubic meter, in the air of the working area - 3.0 milligrams / cubic meter; sanitary protection zone - 100 meters; turnaround time - 3 days. Complex fertilizer "Uni-Agro" can be recommended for use in agriculture of the republic.

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