

## **ECO-TOXICOLOGICAL ASSESSMENT OF QUALITY OF DRINKING WATER, WHICH IS POLLUTED WITH RESIDUES OF MINERAL FERTILIZERS**



In the late 1990s, a large number of non-utilized mineral fertilizers remained in the settlements of Ukraine. Over time, their storage locations were destroyed causing a significant number of problems. In case of improper storage of mineral fertilizer residues, contamination of

environmental components and, primarily, soils occur in the territories of former warehouses and in adjoining areas.

The main ways of receiving mineral fertilizer residues to groundwater are infiltration streams that penetrate through the aeration zone of the soil. Soil cover in this case acts as a deposit environment and infiltration. In the role of priority pollutants of groundwater are heavy metals (Zn, Cu, Pb, Cr, Cd), which are part of the mineral fertilizers. Soil water feeds well that inhabitants of most rural settlements use as drinking water.

The state of health of the population mainly depends on the quality of drinking water. Quite often, well-formed drinking water does not meet the hygienic standards, and it is important to determine its quality. This can be done by the method of ecotoxicological assessment, which determines the toxic effects of natural water constituents on living organisms (use of test objects), and the method of atomic absorption spectrophotometry to determine the toxicity of soils as a geochemical barrier.

In the course of studies on the quality of drinking well water in the village Karavan of Novovodolaz'kyi district of Kharkiv region determined the quality of the soil cover as an intermediate environment. Since mineral fertilizers contain heavy metals, the research was carried out precisely on this indicator (Zn, Cu, Pb, Cr, Cd). The

received results in comparison with SanPiN 2264-80 standards. Current concentrations of chemicals in the soil have not been shown to exceed the MPC. The priority association of heavy metals is Zn-Cu-Pb.

Determination of the quality of drinking water well water by biotesting (Ecological and Toxicological Assessment of the Quality of Surface Water and Bottom Segments, Kharkiv, 2011. p.72) are quite effective. Methods of determining the chronic and acute lethal toxicity showed that 33.3% of the analyzed samples of drinking water (well water) showed an acute lethal toxicity, chronic toxicity was detected in 66.6% of water samples. This suggests that the flow of toxicants to groundwater occurs continuously over a long period of time.

As a result of the ecological and toxicological assessment of the quality of drinking well water contaminated with mineral fertilizer residues it was established that the highest quality class has a sample of water № 2, it belongs to the first class of quality and is "clean" and is suitable for consumption. Sample №1 has the lowest quality class, belongs to the IV class - "dirty", and sample № 3 belongs to the second class of quality - "slightly polluted". For human consumption water of the 1st and 2nd grade of water can be used. Water of the 4th grade does not meet the standards of drinking water quality SanPiN 2.2.4-171-10. "Hygienic requirements for drinking water intended for human consumption" and is not suitable for human consumption.

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