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EVALUATION OF GENOTOXICITY OF SILVER AND COPPER NANOAQUACITRATES USING MICRONUCLEUS TEST ON THE BLOOD CELLS OF *DANIO RERIO*.

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The issue of toxicity of new substances is one of the most urgent in ecology. Nanoaquacitrates of metals are widely applied in many fields of agriculture, veterinary and biology.

One of the most promising fields are application this compounds as antibacterial drugs in fishery. Meanwhile the issue of evaluation safety of nanoaquacitrates remains relevant. Due to simplicity, versatility and rapidity bioassay methods are widely used to toxicity assess. Most methods are registered mortality of individuals, larvae or embryos. But a large number of toxicants may not lead to lethal effects along with causing irreversible changes at the cellular level entering the environment, especially in aquatic ecosystems.

Thus, the aim of the research - to analyze the impact of silver and copper mixture of nanoaquacitrates at the cellular level by micronucleus test and assess the prospects for their practical application.

Danio rerio and their blood cells were used as test-organism to assess the genotoxicity of mixtures of compounds. Control - distilled water with sodium, potassium, calcium and magnesium salt.

The general toxicity tests were carried out in parallel with genotoxicity tests that is test organisms after analyzing toxicity were fixed for making cytological preparations. Preparations of peripheral blood cells were made by patented method.

Analysis of the samples were occurred using a microscope Axio Imager A1 by Carl Zeiss (100-multiple increase), and picture were taken with the camera AxioCam MRm1.

Results of the study showed that the blood cells of zebrafish had no abnormalities in the control. Single red blood cells with micronuclei were observed however cytoplasm close to normal by adding 0,01 mg / dm^3 nanoaquacitrates to control solution. Thus, the addition of such a compound concentration does not cause stress changes in fish. Abundance of cells with micronuclei were observed in the case of the concentration of 0.025 mg / dm^3 mixture of nanoaquacitrates. In addition, the destruction of the cell membrane occurred in isolated places.

In the second series of experiments, samples from fish farming ponds were used as a control

Although this water used for the fish cultivation, test objects had a significant changes at the cellular level during exposure.

A significant number of red blood cells with micronuclei and dual cores were encountered and size of vacuoles increased in the cytoplasm. Increasing the number of white blood cells was observed, that can indicate to the inflammatory processes in the body of fish. That’s why adding nanoaquacitrates are led to increased inflammation and irreversible changes in the cell that were shown in the formation of conglomerates cells.

Thus, the result of micronucleus test demonstrated its sensitivity and information, along with experiments of the general toxicity and the possibility of their combined application.

It has been observed that the response to the effects of nanoaquacitrates on the cellular level has been appeared before the start an irreversible process of destruction and death effects.