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THE INFLUENCE OF GLUTATHIONE ON THE SELF-PURIFICATION CAPACITY OF AQUATIC SYSTEMS

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Removing the impact of chemical substances on the aquatic systems has become very topical and fits into the concept of ecological chemistry which consists of the formation of the chemical composition of the environment, appropriate to a biological value of habitation. Glutathione (GSH) is a substance from the thiol class, of biogenic origin, with strong reducing properties, respectively it actively participates in redox processes in natural waters. To determine the influence of GSH on the *self-purification* process of aquatic systems, several systems were modeled using the radical trap, PNDMA (p-nitroso-N,N-dimethylaniline), which allows the determination of the *inhibition capacity* and stationary concentration of OH radicals in the modeled systems. For this purpose, the following systems were modeled: *GSH-H_2O_2-PNDMA-hυ; GSH-H_2O_2-PNDMA-Cu(II)-hυ; GSH-H_2O_2-PNDMA-Fe(III)-hυ.* All model systems were irradiated with polychromatic lamp DRT-400 and Solar Simulator, Oriel Model 9119X (SS) [1,2].

From the obtained results, it was found that increasing the concentration of GSH in the system leads to an increase in the *inhibition capacity* and a decrease of the OH radicals concentration, for the systems irradiated at all sources. It was determined that the *inhibition capacity* values in the presence of GSH, which was added in concentrations $(0.33\text{-}3.33)\cdot10^5$ M, are of order 10^6-10^5 s^{-1}. According to the *inhibition capacity* parameter, the systems are classified as highly polluted and polluted waters. So, in the presence of GSH, in aquatic systems, the intensity of *self-purification* processes decreases considerably and depends on the concentration of GSH as well as the emission spectrum and the intensity of solar rays.

When Cu(II) ions and more obviously Fe(III) ions are introduced into the system, the *self-purification capacity* of aquatic systems suddenly worsens, which is manifested by increasing the values of the *inhibition capacity* and decreasing the concentration of OH radicals. The values of the *inhibition capacity* in the presence of Cu(II) ions increase by 1.3-3.5 times, and in the presence of Fe(III) ions by 1.5-5.3 times and depend on the concentration of GSH, as well as the source of irradiation. So it was confirmed that GSH binds Cu(II) and Fe(III) ions in complexes of the form: $(GSH)_2Cu^+$ and $(GSH)_2Fe^{2+}$, which have a much higher reactivity towards OH radicals compared to systems where GSH is present and lead to their consumption. As a result of the given research, it was demonstrated that GSH, having a strong reducing character, leads to the consumption of oxidative equivalents in aquatic systems on the one hand, and on the other hand excludes Cu(II) and Fe(III) ions (which have an important role of catalysts in oxidation-reduction processes in natural waters), thus diminishing the intensity of the *self-purification* processes of aquatic systems.

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