

ЕКОЛОГІЧНА БЕЗПЕКА І ТЕХНОЛОГІЇ ЗАХИСТУ УРБАНІЗОВАНОГО ДОВКІЛЛЯ

RESEARCH OF THE CONTENT OF ONE OF THE MAIN INDICATORS OF ENVIRONMENTAL SAFETY IN A SURFACE WATER BODY

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Despite the huge role of surface water bodies, in many processes occurring in the environment, the current state is assessed as «critical». In connection with the constant influence of the industry of Ukraine on the components of the natural environment, in particular, surface water bodies, the analysis of changes in their ecological state in accordance with Article 13 of the Water Code of Ukraine is carried out according to the basin principle (*Ponomarenko. 2020; Shuvar, 2022*). The main causes of pollution of surface water bodies: entry of pollutants into water bodies together with surface runoff and agricultural land; discharge of untreated or insufficiently treated industrial and municipal wastewater directly into water bodies.

One of the most ecologically stressed areas of Ukraine is the Samara River basin. Man-made load has led to its significant pollution. A significant number of coal mines of coal-mining enterprises, which are also located in the Dnipropetrovsk region, make a significant contribution to the pollution of the surrounding natural environment, in particular, surface water bodies (*Kulikova, 2019*). Most of the basin's water bodies are unsuitable for drinking water supply, fisheries, public recreation, and agricultural use. According to the data of the regional report on the state of the environment in the Dnipropetrovsk region in 2020, the polluting enterprises of the Samara are Limited Liability Company "Dnipropetrovsk Research Plant «Energoavtomatika» (production of batteries and accumulators), Utility Enterprise «Ternivsk Housing and Utility Enterprise», Utility Enterprise «Pavlogradsk Production Department of Water Supply and Sewage Management» of the Pavlograd City Council, Utility Enterprise Novomoskovsk Vodokanal. In total, the specified enterprises dumped 21,421.9 thousand m³ of wastewater into the Samara, of which 18,475.2 thousand m³ are not cleaned enough. 22.1 million m³, which is 55% of the total discharge of polluted return waters of the Samara River basin, is carried out by

coal industry enterprises: State Open Joint Stock Company Pavlogradsk Mining Department is the largest coal mining enterprise of Ukraine, one of the 10 mines located in the Dnipropetrovsk region.

The analysis of changes in the ecological state of the Samara River was carried out based on the data of the State Water Resources Agency from 3 observation posts in 2020: 1) Nikolske, Oleksandriv district, border of Donetsk and Kharkiv regions; 2) Verbky, Pavlograd district 3) Pidgorodnoe, Dnipropetrovsk district, Dnipropetrovsk region.

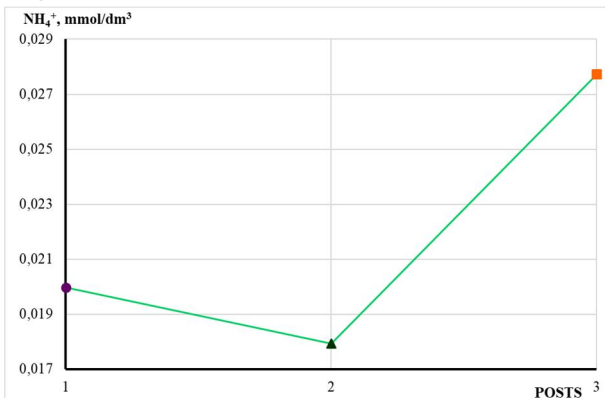


Figure 1 – The total content of ammonium ions mmol/dm³, according to water intake points of the Samara

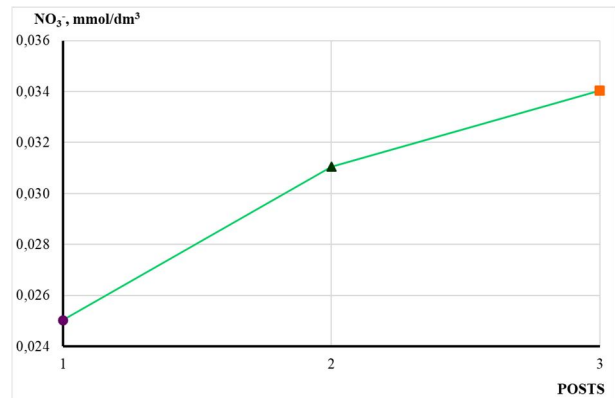


Figure 2 – Nitrate content mg/dm³, according to observation posts of the Samara

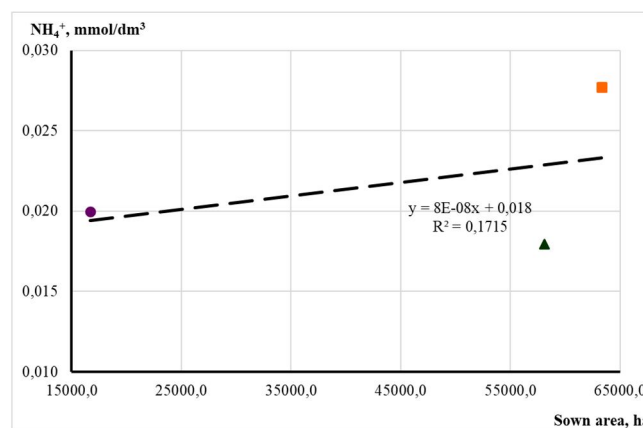
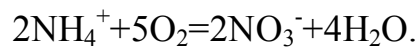


Figure 3 – Dependence of the content of ammonium ions on the cultivated areas where the observation posts are located

Figure 1 shows a decrease in the content of ammonium ions from post 1 to post 2, and from post 2 to post 3, on the contrary, an increase. According to Figure 3, the content of NH₄⁺ increases with the increase of cultivated areas (the data are given according to the information of the main statistics office of Donetsk and Dnipropetrovsk regions). According to the data of the regional report on the state of the natural environment in the Dnipropetrovsk region, crop production is quite

developed, namely wheat, sunflower, and corn are grown. That is, it can be assumed that the ammonium content in the Samara increases as a result of the use of a significant amount of mineral fertilizers. Regarding the decrease in its content, it can be assumed that one of the reasons for this phenomenon may be the oxidation of ammonium ions by oxygen, which leads to the formation of nitrates, which is confirmed by Figure 2.



It is also known that mine waters may contain ions of heavy metals, for example, copper, aluminum, etc. They form complex ions with ammonium, which during sample analysis do not reflect the presence of free ammonium in the surface water body. This may also be the reason for the decrease in ammonium ion content at post 2 in Figure 1.

However, for a more detailed analysis of the ecological state of the surface water body, it is rational to install additional stations for sampling.

References

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WASTE BATTERIES GENERATION IN CHINA

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Similarly to many other countries, China generates large amount of waste batteries. These are hazardous waste that have to be managed in specific manner [1].