



Influence of artificial infiltration on the removal of surfactants from surface waters

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ABSTRACT

Surfactants present in natural surface waters negatively affect the self-purification processes of water due to foaming, oxygen deficiency and eutrophication of water reservoirs. Consumed with water, they adversely affect human health. The purpose of the research conducted in the period from 2019 to 2022 was to determine the effectiveness of removing anionic and non-ionic surfactants in the process of artificial infiltration carried out at surface water intakes. The research was carried out on an experimental field installation located at the surface water infiltration intake. The experimental installation consisted of three metering wells (piezometers) located on the way between the infiltration pond and the collecting well. Water samples collected from the pond, from piezometers and from the well allowed to assess the change in concentrations of selected surfactants during the flow of water through the ground from the pond to the well. The analysis of the content of non-ionic surfactants was carried out by the method of iodobismutane determination with the final measurement of bismuth-thiourea (BiAS-thio) absorbance. A simplified method for the determination of anionic surfactants using methylene blue (MBAS) was used to measure the concentration of anionic surfactants. The presented studies carried out during the pandemic in 2019–2022 show a significant increase in the concentration of non-ionic surfactants in water collected from the infiltration pond. The presented research results indicate that artificial infiltration can be treated as a robust and effective barrier eliminating surfactants from treated water before the treatment plant technology. The main effect of surfactant removal occurs in the first section of the ground flow. Interpretation of the results allowed to conclude that the sediment layer at the bottom of the infiltration pond plays a major role in the removal of surfactants. Biodegradation is the main process responsible for the removal of non-ionic and ionic surfactants in the infiltration process.

Keywords: Water intake; Artificial infiltration; Anionic surfactants; Non-ionic surfactants; MBAS; BiAS-thio

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