

PERSISTENT ORGANIC MICROPOLLUTANTS ABATEMENT BY ELECTROCHEMICAL METHOD

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The mechanisms of pharmaceuticals transformation in natural waters differ from that occurring during purification at Wastewater Treatment Plant (WTP). Some pharmaceutical contaminants absolutely dissolve because of a reagent, action; others do not change their molecular structure at all. Starting from different properties of pharmaceuticals there exist different treatment methods: 1) filtration (using membranes, micro-strainers, ultra-filtration); 2) sorption (mineral and molecular polymers, active carbon); 3) oxidation; 4) biological treatment. Nevertheless, there is no universal method providing for a treatment of all pharmaceuticals. Therefore, persistent pharmaceuticals in small concentrations are discharged with the wastewater into the environment. There is the greatest danger of presence of these compounds in surface waters, where they accumulate and can be involved in the trophic chains. In addition, the negative impact on aquatic ecosystems has inappropriate microorganisms for them that break the structure of the natural biota groups and environmental ecosystem functions. Therefore, the improvement of effective purification process, especially for hard biodegraded substances, is the issue of the day. This discharge could be reduced with the application of additional post/pre treatment steps using advanced treatment techniques, e.g., adsorption on activated carbon, ozone oxidation or advanced oxidation processes (AOP). The electrochemical technology has attracted a huge deal of attention due to its versatility, amenability to automation and environmental compatibility, and wide range treatment of different pollutants. The preliminary research of using electrochemical destruction of 5 hard biodegradable pharmaceuticals substances (presented 5 main pharmacological groups) contained in hospital wastewaters has confirmed by the method of liquid chromatography mass spectrometry that all of these molecules were completely destroyed during the purification process.