



Effect of ozonation on organic substance removal efficiency during adsorption

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ABSTRACT

The aim of the presented study was to evaluate the effect of the ozonation process before activated carbon adsorption on organic substance removal effectiveness and the adsorption process as a whole. The study was conducted in two flow-type water treatment systems: the reference and the test system. Both systems functioned continuously with a throughput of 3 m³/h, supplied by water uptake from Olawa River. Water was subjected to coagulation, sedimentation, rapid filtration, ozonation (reference system only) and adsorption. Such a configuration of processes allowed for a comparison of the effectiveness of organic substance removal during adsorption preceded by ozonation. Generally, the removal efficiency of dissolved organic carbon decreased with time since the study started, corresponding to decreasing bed adsorption capacity. The novelty of the research is the combination of chemical analysis with the microbiological aspect. Chemical transformations prove more effective in removing organic compounds by the use of the ozonation process before the activated-carbon filters. The assessment of the microbial content flushed into water indicates an increased development of biofilm in the reference system, which also intensifies the removal of organic compounds. The specific UV absorbance values after the adsorption process in both systems indicate the presence of organic substances of low molecular mass.

Keywords: Granular activated carbon filter; Organic matter; Microorganism; Ozonation; Water

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