

REMOVAL OF ENVIRONMENTALLY HARMFUL PHARMACEUTICALS VIA ADSORPTION ON ACTIVATED CARBON

Pavúková D.¹, Fašková L.¹, Mališová E.¹, Gál M.¹, Híveš J.¹

¹ *Faculty of Chemical and Food Technology, Slovak University of Technology in Bratislava, Bratislava, Slovakia*

Pharmaceutically active compounds (PhACs) represent a large group of micropollutants. Numerous studies have confirmed that PhACs and their metabolites are frequently detected in water bodies worldwide. Their presence in the environment can harm various aquatic and nonaquatic organisms, plants or even people. In this work, we studied the adsorption of diclofenac, sulfamethoxazole, and cetirizine onto two types of commercially available activated carbon (Colorex and Carborafin). It was found that the main property that affected the removal efficiency was the volume of micropores and mesopores of the carbon. Overall higher removal efficiencies were achieved using microporous Colorex. The highest removal efficiency was recorded when removing sulfamethoxazole (79%). The data were fitted into a pseudo-second-order kinetic model. Obtained parameters showed a higher adsorption rate in the case of Carborafin but higher maximum equilibrium uptake in the case of Colorex. We found no noticeable correlation between PhACs water solubility and removal efficiency of activated carbon. The same can be concluded for the effect of hydrophobicity/hydrophilicity of the pharmaceuticals.

Acknowledgement

This research was financially supported from Ministry of Education, Science, Research and Sport of the Slovak Republic under the projects VEGA 1/0343/19.