Szlachta, M., Adamski, W. Application of Adsorption on Powdered Active Carbon for the Removal of Dissolved Organic Substances from Surface Water. *Ochrona Srodowiska* 2009, Vol. 31, No. 2, pp. 61–66.

Abstract: The efficiency of adsorption onto powdered active carbon (PAC) when used for the removal of dissolved organic matter (DOM) from surface water was determined. The DOM that was present in the investigated water showed a high affinity for the adsorbent, as could be inferred from the shape of the adsorption isotherms. The adsorption of these pollutants was well described by the Langmuir model. The efficiency of the adsorption process (which was analyzed in terms of PAC dose and time of contact between the adsorbent and natural water) was found to vary as a function of PAC–water contact time. During the first minutes the process ran at a very fast rate, and at that stage the majority of small-sized particles were subject to sorption. Adsorption efficiency in reducing dissolved organic carbon (DOC) concentration and UV absorbance (λ=254 nm) increased with the increase in the adsorbent dose, the extent of removal being higher when the organic substances were of an aromatic nature. The substantial differences in efficiency between particular PAC doses suggested an effective utilization of the internal surface of the carbon's porous structure. Consideration was also given to the influence of water quality on the efficiency of the adsorption process. For this purpose experiments were conducted to determine the extent of DOC adsorption before and after coagulation, and they revealed an increase in the adsorption of DOM from pretreated water. This seems to be attributable to the removal of high-molecular-weight colloids, which may have prevented low-molecular-weight DOM fractions from entering the internal surface of the porous structure of the PAC.

Keywords: Powdered active carbon (PAC), adsorption, Langmuir isotherm, kinetic curve, surface water, dissolved organic matter (DOM), dissolved organic carbon (DOC), UV absorbance.