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Submicron powdered activated carbon used as a pre-coat in ceramic micro-filtration

S.G.J. Heijman[a,b]*, J.Z. Hamad[c], M.D. Kennedy[c], J. Schippers[c], G. Amy[b,c]

[a]*KWR Watercycle Research Institute, P.O. Box 1072, 3430 BB, Nieuwegein, The Netherlands*
email: s.g.j.heijman@tudelft.nl
[b]*Delft University of technology, Faculty of Civil Engineering and Geosciences*
[c]*UNESCO-IHE Institute for Water Education, P.O. Box 3015, 2601 DA Delft, The Netherlands*
email: m.kennedy@unesco-ihe.org

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ABSTRACT

The aim of the research is to show the bene fits of the use of submicron powdered activated carbon (SPAC) in combination with ceramic microfiltration. The SPAC is applied to the surface as a pre-coat layer. The goals are to improve the removal of NOM and organic micro-pollutants. The SPAC pre-coat layer is also used to reduce fouling of the microfiltration membrane (without the use of a coagulant). Additionally, virus removal might be increased by the SPAC-layer. The results are presented from laboratory scale experiments with flat sheets membranes and from pilot experiments with a ceramic membrane module. The laboratory scale experiments show good results for NOM removal and atrazine removal. Although the empty bed contact time is very short (<1 s), actual breakthrough curves are observed for these two components. The small particle size is beneficial for the adsorption kinetics of the components. In the laboratory experiment, the SPAC also contributed to physical removal (straining) of biopolymers during the filtration of surface water. Because these biopolymers are removed before they can reach the membrane surface, we expect that the fouling of the ceramic membrane will decrease. However, we could not confirm this in pilot experiment because the SPAC layer did not evenly coated the membrane surface or the SPAC was already flocculated before being dosed to the membrane.

Keywords: Ceramic membranes; Powdered activated carbon; Micro-pollutants; Pre-coat

* Corresponding author.

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