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- Title and Author Search

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## An innovative treatment concept for future drinking water production: fluidized ion exchange – ultrafiltration – nanofiltration – granular activated carbon filtration

Sheng Li<sup>1</sup>, S. G. J. Heijman<sup>1,2</sup>, J. Q. J. C. Verberk<sup>1</sup>, and J. C. van Dijk<sup>1</sup>  
<sup>1</sup>Delft University of Technology, P.O. Box 5048, 2600 GA Delft, The Netherlands  
<sup>2</sup>Kiwa Water Research, P.O. Box 1072, 3430 BB Nieuwegein, The Netherlands

**Abstract.** A new treatment concept for drinking water production from surface water has been investigated on a pilot scale. The treatment concept consists of fluidized ion exchange (FIEX), ultrafiltration (UF), nanofiltration (NF), and granular activated carbon filtration (GAC). The FIEX process removed calcium and other divalent cations; the UF membrane removed particles and micro-organisms; and the NF membrane and GAC removed natural organic matter (NOM) and micro-pollutants. This study focused on the prevention of fouling of the UF and scaling of the NF and investigated the overall removal of micro-pollutants by the treatment concept. The results of the experiments showed that in 14 days of continuous operation at a flux of 65 l/h m<sup>2</sup> the UF performance was stable with the FIEX pre-treated feed water without the aid of a coagulant. The scaling of the NF was also not observed even at 97% recovery. Different micro-pollutants were spiked in the NF feed water and their concentrations in the effluent of NF and GAC were measured. The combination of NF and GAC removed most of the micro-pollutants successfully, except for the very polar substances with a molecular weight lower than 100 Daltons.

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