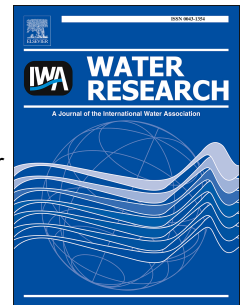


Accepted Manuscript

Impacts of backwashing on granular activated carbon filters for advanced wastewater treatment

Joshua Frank, Aki Sebastian Ruhl, Martin Jekel



PII: S0043-1354(15)30233-5

DOI: [10.1016/j.watres.2015.09.020](https://doi.org/10.1016/j.watres.2015.09.020)

Reference: WR 11528

To appear in: *Water Research*

Received Date: 12 June 2015

Revised Date: 9 September 2015

Accepted Date: 10 September 2015

Please cite this article as: Frank, J., Ruhl, A.S., Jekel, M., Impacts of backwashing on granular activated carbon filters for advanced wastewater treatment, *Water Research* (2015), doi: 10.1016/j.watres.2015.09.020.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Impacts of backwashing on granular activated carbon filters for advanced wastewater treatment

Joshua Frank¹, Aki Sebastian Ruhl^{1,*} and Martin Jekel¹

¹Chair of Water Quality Control, Technische Universität Berlin, Sekr. KF4, Straße des 17. Juni 135, 10623 Berlin, Germany.

*Corresponding author, Tel.: +49 30 314 25493; fax: +49 30 314 23313. E-mail: aki.s.ruhl@tu-berlin.de

Abstract

The use of granular activated carbon (GAC) in fixed bed filters is a promising option for the removal of organic micropollutants (OMP) from wastewater treatment plant effluents. Frequent backwashing of the filter bed is inevitable, but its effect on potential filter stratification is not well understood yet and thus has been evaluated in the present study for two commercial GAC products. Backwashing of GAC filters was simulated with 10 or 100 filter bed expansions of 20 or 100% at backwash velocities of 12 and 40 m/h, respectively. Five vertical fractions were extracted and revealed a vertical stratification according to grain sizes and material densities. Sieve analyses indicated increasing grain sizes towards the bottom for one GAC while grain sizes of the other GAC were more homogeneously distributed throughout the filter bed. The apparent densities of the top sections were significantly lower than that of the bottom sections of both products. Comparative long term fixed bed adsorption experiments with the top and bottom sections of the stratified GAC showed remarkable differences in breakthrough curves of dissolved organic carbon, UV light absorption at 254 nm wavelength (UVA₂₅₄) and OMP. GAC from the upper section showed constantly better removal efficiencies than GAC from the bottom section, especially for

Download English Version:

<https://daneshyari.com/en/article/6365976>

Download Persian Version:

<https://daneshyari.com/article/6365976>

[Daneshyari.com](https://daneshyari.com)