

Accepted Manuscript

Title: The toxicity of cationic surfactant HDTMA-Br, desorbed from Surfactant Modified Zeolite, towards faecal indicator and environmental microorganisms

Authors: Peter J. Reeve, Howard J. Fallowfield



PII: S0304-3894(17)30443-0
DOI: <http://dx.doi.org/doi:10.1016/j.jhazmat.2017.06.022>
Reference: HAZMAT 18643

To appear in: *Journal of Hazardous Materials*

Received date: 3-2-2017
Revised date: 1-5-2017
Accepted date: 12-6-2017

Please cite this article as: Peter J.Reeve, Howard J.Fallowfield, The toxicity of cationic surfactant HDTMA-Br, desorbed from Surfactant Modified Zeolite, towards faecal indicator and environmental microorganisms, Journal of Hazardous Materials <http://dx.doi.org/10.1016/j.jhazmat.2017.06.022>

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.

The toxicity of cationic surfactant HDTMA-Br, desorbed from Surfactant Modified Zeolite, towards faecal indicator and environmental microorganisms

Peter J. Reeve and Howard J. Fallowfield^a

^aHealth and Environment Group, School of the Environment, Flinders University, Sturt Road, Bedford Park, SA 5042, Australia, peter.reeve@flinders.edu.au, telephone: +61 8 7221 8585, fax +61 8 7221 8590 (corresponding author) and howard.fallowfield@flinders.edu.au, telephone +61 8 7221 8581

Highlights

- Surfactant (HDTMA-Br) desorption from two SMZ's was quantified by *E. coli* bioassay.
- HDTMA-Br was toxic to the faecal indicators, bacteriophage MS2 and *E. coli*.
- HDTMA-Br toxic to soil bacterium *B. subtilis* but not general soil microflora.
- Desorbed surfactant may not be environmentally benign.

Abstract

Surfactant Modified Zeolite (SMZ) represents a versatile, cost-effective permeable reactive material, capable of treating multiple classes of contaminants. The potential for HDTMA-Br, a cationic surfactant commonly used to modify zeolite, to desorb from the zeolite surface has been identified as a potential issue for the ongoing use of SMZ in water remediation contexts. This paper investigates the toxicity of HDTMA-Br to enteric virus surrogates, F-RNA bacteriophage MS2 and *E. coli*, *Bacillus subtilis*, and soil microflora. The concentration of surfactant desorbing from SMZ was quantified through a bioassay using *E. coli*.

Results showed HDTMA-Br concentrations of $\geq 10^{-5}$ M were toxic to MS2, $\geq 10^{-4}$ M were toxic to *E. coli* and $\geq 10^{-6}$ M were toxic to *B. subtilis*. No toxic relationship was established between HDTMA-Br and soil microflora. Desorption of $\geq 10^{-4}$ M of HDTMA-Br was shown for the two SMZ samples under the mixing conditions used. Effects of this surfactant on total soil microflora were ambiguous since no toxic relationship could be established, however, HDTMA-Br, at concentrations desorbing from SMZ, were shown to impact the soil bacterium

Download English Version:

<https://daneshyari.com/en/article/4979339>

Download Persian Version:

<https://daneshyari.com/article/4979339>

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