

## Accepted Manuscript

Title: Advanced oxidation of a commercially important nonionic surfactant: Investigation of degradation products and toxicity

Author: <ce:author id="aut0005"> Akin Karci<ce:author id="aut0010"> Idil Arslan-Alaton<ce:author id="aut0015"> Miray Bekbolet



PII: S0304-3894(13)00239-2  
DOI: <http://dx.doi.org/doi:10.1016/j.jhazmat.2013.03.052>  
Reference: HAZMAT 15019

To appear in: *Journal of Hazardous Materials*

Received date: 23-10-2012  
Revised date: 7-2-2013  
Accepted date: 21-3-2013

Please cite this article as: A. Karci, I. Arslan-Alaton, M. Bekbolet, Advanced oxidation of a commercially important nonionic surfactant: Investigation of degradation products and toxicity, *Journal of Hazardous Materials* (2013), <http://dx.doi.org/10.1016/j.jhazmat.2013.03.052>

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.

# Advanced oxidation of a commercially important nonionic surfactant: Investigation of degradation products and toxicity

Akin Karci<sup>a\*</sup>, Idil Arslan-Alaton<sup>b</sup>, Miray Bekbolet<sup>a</sup>

<sup>a</sup>*Boğaziçi University, Institute of Environmental Sciences, 34342 Bebek, Istanbul, Turkey*

<sup>b</sup>*Istanbul Technical University, Faculty of Civil Engineering, Department of Environmental Engineering, 34469 Maslak, Istanbul, Turkey*

\* Corresponding author

E-mail: akin.karci@boun.edu.tr (A. Karci)

## ABSTRACT

The evolution of degradation products and changes in acute toxicity during advanced oxidation of the nonionic surfactant nonylphenol decaethoxylate (NP-10) with the H<sub>2</sub>O<sub>2</sub>/UV-C and photo-Fenton processes were investigated. H<sub>2</sub>O<sub>2</sub>/UV-C and photo-Fenton processes ensured complete removal of NP-10, which was accompanied by the generation of polyethylene glycols with 3-8 ethoxy units. Formation of aldehydes and low carbon carboxylic acids was evidenced. According to the acute toxicity tests carried out with *Vibrio fischeri*, degradation products being more inhibitory than the original NP-10 solution were formed after the H<sub>2</sub>O<sub>2</sub>/UV-C process, whereas the photo-Fenton process appeared to be toxicologically safer since acute toxicity did not increase relative to the original NP-10 solution after treatment. Temporal evolution of the acute toxicity was strongly correlated with the identified carboxylic acids being formed during the application of H<sub>2</sub>O<sub>2</sub>/UV-C and photo-Fenton processes.

*Keywords:* Acute toxicity; Degradation product; H<sub>2</sub>O<sub>2</sub>/UV-C process; Nonylphenol decaethoxylate (NP-10); Photo-Fenton process

Download English Version:

<https://daneshyari.com/en/article/10372630>

Download Persian Version:

<https://daneshyari.com/article/10372630>

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