

Accepted Manuscript

Contributions of various processes to the removal of surfactants and personal care products in constructed wetland

C. Ramprasad, Ligy Philip

PII: S1385-8947(17)31605-4
DOI: <https://doi.org/10.1016/j.cej.2017.09.106>
Reference: CEJ 17691

To appear in: *Chemical Engineering Journal*

Received Date: 25 June 2017
Revised Date: 17 September 2017
Accepted Date: 18 September 2017

Please cite this article as: C. Ramprasad, L. Philip, Contributions of various processes to the removal of surfactants and personal care products in constructed wetland, *Chemical Engineering Journal* (2017), doi: <https://doi.org/10.1016/j.cej.2017.09.106>

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.



Contributions of various processes to the removal of surfactants and personal care products in constructed wetland

C. Ramprasad and Ligy Philip*

*Corresponding author; E-mail id: ligy@iitm.ac.in

Department of Civil Engineering, Environment and Water Resource Engineering Division,
Indian Institute of Technology Madras, Chennai, Tamil Nadu, India

Abstract:

In the present study, the systematic approach to access the fate and predominant pathway of selected surfactants and personal care products (sodium dodecyl sulphate, propylene glycol and trimethyl amine) in hydroponic mesocosms, biodegradation and adsorption by soils are described. The overall objective of the study is to determine the kinetics of depletion (from solution) and uptake of pollutants by plants (*Phragmites australis*) growing hydroponically, biodegradation kinetics of target pollutants under aerobic, anoxic and anaerobic conditions and determine the adsorption kinetics of three target pollutants in four different soils. The potential for translocation from root to shoot, bio-concentration and risk assessment of these three surfactants and personal care products were also assessed. After 35 days of hydroponics experiment, nearly 20% of the sodium dodecyl sulphate was removed from the nutrient solution followed by propylene glycol (19.2%) and trimethyl amine (14.5%). The photodegradation played a very minor role in the pollutant degradation. Amongst the three target pollutants trimethyl amine was more (8.16%) taken up by the plants followed by propylene glycol (7.2%) and sodium dodecyl sulphate (5.2%). It was also found that all the three pollutants are biodegraded by the enriched microbes within 3 days, with higher rate observed for propylene glycol. Sodium dodecyl sulphate found to be a recalcitrant was maximum (58.2%) sorbed to the soil surface followed by trimethyl amine and propylene glycol. Hence, a treatment system that combines the adsorption, biodegradation and plant uptake will be the viable option for elimination the surfactants and personal care products contaminated water.

Keywords:

Wetland; Phytoremediation; Biodegradation; Adsorption; Sodium dodecyl sulphate; Propylene glycol; Trimethyl amine; Phragmites australis

Download English Version:

<https://daneshyari.com/en/article/4762682>

Download Persian Version:

<https://daneshyari.com/article/4762682>

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