



## The study of electron equivalent fluxes about decomposition of sulfamethazine and sulfathiazole using oxygen-based membrane biofilm reactor

Joonkyu Kim<sup>a</sup>, Janghyung Suk<sup>a</sup>, Duckhyun Nam<sup>a</sup>, Keumryul Ha<sup>a</sup>, Younkyoo Choung<sup>b,\*</sup>

<sup>a</sup>Environmental Research and Engineering Team, Technology Research Institute, Daelim Co., Ltd, Seoul 146-12, Korea

<sup>b</sup>Department of Civil and Environmental Engineering, College of Engineering, Yonsei University, Seoul 120-749, Korea

Tel. +44 020 7017 6224; email: joonkim9@daelim.co.kr

Received 20 October 2010; Accepted 11 March 2012

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### ABSTRACT

The subject of this research was electron equivalent fluxes about the decomposition of pharmaceuticals (sulfamethazine and sulfathiazole) using an oxygen-based membrane biofilm reactor (MBfR). The influent concentrations in pharmaceuticals feed-medium were (in ppb): sulfamethazine (40) and sulfathiazole (85). The oxygen-based MBfR system consisted of two membrane modules connected to a recirculation loop. The main membrane module contained a bundle of 32 hydrophobic hollow-fiber membranes inside a polyvinyl-chloride pipe shell and the other module contained a single fiber used to take biofilm samples. Pure O<sub>2</sub> was supplied to the inside of the hollow fibers through the manifold at the base, and the O<sub>2</sub> pressure for both reactors was 13 kPa. (1 kPa = 0.0099 atm = 0.145 psi). HRT was 3 h. The decomposition ratio of pharmaceuticals (sulfamethazine and sulfathiazole) using oxygen-based MBfR was (%): sulfamethazine (77 ± 2) and sulfathiazole (87 ± 2). In all cases, nitrification was the largest provider of electrons, together accounted for at least 99.98% of the total electron flux.

*Keywords:* Electron equivalent flux; Oxygen; Membrane biofilm reactor; Sulfamethazine; Sulfathiazole

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\*Corresponding author.

*Membranes in Drinking and Industrial Water Treatment—MDIW 2010, June 27–30, 2010, Trondheim, Norway*

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