

## Anthraquinone compounds as redox mediators for enhanced continuous-flow anaerobic biotransformation of reactive dyes under hypersaline conditions

Young H. Lee<sup>a,c</sup>, Lawrence A. Bottomley<sup>b</sup>, Spyros G. Pavlostathis<sup>c\*</sup>

<sup>a</sup>Center for Environmental Technology Research, Korea Institute of Science and Technology, Seoul 136-791, South Korea

<sup>b</sup>School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta GA 30332, USA

<sup>c</sup>School of Civil and Environmental Engineering, Georgia Institute of Technology, Atlanta GA 30332-0512, USA

Tel. +1 (404) 8949367; Fax +1 (404) 8948266; email: [spyros.pavlostathis@ce.gatech.edu](mailto:spyros.pavlostathis@ce.gatech.edu)

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### ABSTRACT

The effect of anthraquinone disulfonate (AQDS) on the decolorization of the azo dye Reactive Red 198 (RR198) and the anthraquinone dye Reactive Blue 4 (RB4), as well as the effect of RB4 on the decolorization of RR198, both AQDS and RB4 serving as redox mediators, was assessed. An anaerobic, continuous-flow, fluidized-bed bioreactor with an immobilized halotolerant mixed culture was used in this study. All tests were performed at a reactor temperature of 35°C, a hydraulic retention time of 6.1 h, pH 7.2±0.1, with glucose used as the carbon and electron source. AQDS at relatively low influent concentrations (10–150 µM) enhanced the extent of RR198 reduction, but had a negligible effect on the biodecolorization of RB4. At an equal concentration of 50 µM, RB4 and AQDS had a similar enhancing effect on the biodecolorization of the azo dye RR198. Therefore, anthraquinone dyes can serve as redox mediators in mixed, spent textile dyebaths potentially leading to enhanced reductive biodecolorization rate and extent of other types of dyes (i.e., azo dyes).

*Keywords:* Textile dyes; Decolorization; Redox mediators; Fluidized-bed bioreactor; Salt

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\* Corresponding author.