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Biological treatment of a saline and recalcitrant petrochemical wastewater by using a newly isolated halo-tolerant bacterial consortium in MBBR

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ABSTRACT

A halo-tolerant bacterial consortium comprised of *Pseudomonas pseudoalcaligenes strain R1*, *Bacillus subtilis* subsp. *inaquosorum R2* and *Shewanella chilikensis strain AM1* were isolated and used as inoculums in a moving bed bioreactor for treatment of a saline petrochemical wastewater. Observations demonstrated the halo-tolerant capability of isolated strains up to around 3.2%. The influence of varying organic loading rates and TDS concentrations were evaluated on bioreactor efficiency and biokinetic coefficients. A COD removal of 77% was observed for organic loading rate of less than 2.7 kg COD m^{-3} d^{-1} and TDS concentrations of 25,000 and 30,000 mg L^{-1}. Growth yield (Y) varied from 0.178 to 0.129 mg VSS mg COD^{-1} in different TDS concentrations. Results indicated that the biokinetic coefficients were in the range close to typical ranges reported for similar industrial wastewaters, except that of the half saturation constant (K_s).

Keywords: Biokinetic coefficient; Halo-tolerant bacteria; Moving bed bioreactor; Petrochemical wastewater treatment; Saline wastewater

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