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Biodegradation of 1-amino-4-bromoanthraquinone-2-sulfonic acid using combined airlift bioreactor and biological activated carbon

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The biodegradation of 1-amino-4-bromoanthraquinone-2-sulfonic acid (ABAS) in combined airlift loop reactor (ALR) and biological activated carbon (BAC) process was investigated. The results showed that ALR using *Sphingomonas xenophaga* as inocula and granular activated carbon (GAC) as carrier could run steadily for over 4 months at ABAS concentration of <1000 mg/L, and the efficiencies of ABAS decoloration and COD removal in ALR were reached to about 90% and 50%, respectively within 12h. When it was further aerated, ALR effluent became yellow with maximum absorbance at 447 nm and HPLC-MS analysis revealed that the yellow intermediate was a dimmer resulting from the autoxidation of ABAS decolorization products. The suspended cells in ALR were mainly composed of uniform bacillus surrounded colloidal matters, thus showing good settle performance. Whereas GAC surface in ALR comprised an abundance of microbes, such as coccus, bacillus and filamentous bacteria. Further biotreatment of ALR effluent indicated that, BAC system showed better performance with about 90% TOC removal, compared with activated sludge system with only less 10% TOC removal. Because the adsorption of GAC resulted in lower concentration of ABAS biodecolorization products in liquid phase and slower auto-oxidation rates, ABAS decolorization products could be biodegraded gradually. The concentrations of Br- and SO_4^{2-} in BAC increased as TOC removal. Ultimately, 89.2% TOC removal was achieved and the release efficiencies of Br- and SO_4^{2-} were 73.5% and 67.4%, respectively. It indicated that BAC system was effective in the biodegradation of auto-oxidative aromatics concentration-dependent.

Biography

Jing Wang graduated from Harbin Institute of Technology (HIT) and received his Ph. D in 1996. He worked for Dalian University of Technology since 1996. From 2000-2002, he worked in The National University of Yokohama, Japan for one and half years. His works focus on the biodegradation of recalcitrant organics and novel mediator technologies for enhanced biotreatment. Until now he has taken over 20 scientific projects and published more than 60 papers. He won several scientific awards including Natural Science Awards of Liaoning Province.

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