

TREATMENT OF DIMETHYL-SULFOXIDE-CONTAINING OPTOELECTRONICS WASTEWATER  
USING AIRLIFT BIOREACTOR WITH PVA-IMMOBILIZED CELL BEADS

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Abstract

DMSO (dimethyl sulfoxide) is a useful and inexpensive environment benign solvent easy to recycle. Its industry-wide adoption has revealed an odorous problem to the industrial parks and their adjacent residential areas due to its decomposition product, DMS (dimethyl sulfide). Our research goal is to develop a feasible biological treatment technology to effectively treat the DMSO into oxidative pathway instead of going to the DMS pathway. We have adopted the specific activated sludge as bacterial inoculums to decompose the DMSO into DMSO<sub>2</sub> pathway from the wastewater treatment plant of a DMSO-producing chemical plant. In this year, we focused on the research results from the immobilization technology, the repeated batch process and the effect of sucrose addition. Finally, we have found that the best pH range in biodegradation of DMSO using a PVA-immobilized cell beads is 5.0-8.5. The best dose of sucrose is 0-50 mg L<sup>-1</sup> that helps bacteria to tolerate the toxicity of DMSO. From the repeated batch process, we found the sucrose help improve the treatment efficiency only for the raw activated sludge rather than the acclimated sludge. In the performance of airlift bioreactor, the PVA-immobilized cell beads can degrade the 1,200-mg L<sup>-1</sup> DMSO within 45 hr, in comparison to the 10 hr for the free cell system in decomposition of 850-mg/L DMSO.

Keyword : activated sludge 、 biological treatment technology 、 DMSO 、 immobilization technology 、 airlift bioreactor