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Dibenzofuran Degradation by Bacterial Community in Landfill Leachate
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Abstract

The contamination of the environment has been a global issue, and bioremediation is proposed as an option to clean up the contamination sites with the promising utilization of bacterial community capabilities. The indigenous bacterial community in the landfill leachate is recognized to carry enzymes for the degradation of contaminants such as dioxin congeners, the dibenzofuran. Environmental factors have been known to influence the process to achieve successful biodegradation, and the optimized conditions may speed up the biodegradation process. Thus, this study was conducted to optimize the substrate availability, temperature, and pH factor for the degradation of dibenzofuran from landfill leachate by the native bacterial community in landfill leachate. This study uses the one-factor at-time (OFAT) approach to measure dibenzofuran degradation. The landfill leachate with enrichment of dibenzofuran (15 to 45 mg L⁻¹) was incubated at temperatures (30°C to 42°C) and pH (5 to 9) for 24 hours before being extracted and analyzed. From the first part of the study, 15 mg L⁻¹ of dibenzofuran, 30°C temperature, and pH 7 have shown the highest dibenzofuran degradation. Later, the optimum condition of dibenzofuran removal (74.40%) was achieved when the landfill leachate was spiked with 15 ppm dibenzofuran at 30°C and pH 7 for 24 hours. This study proposes optimized conditions that give a better result for dibenzofuran degradation, which may enhance bioremediation. © Universiti Putra Malaysia Press.

Author Keywords

Bacterial community; biodegradation; dibenzofuran; landfill leachate; One-Factor-at-a-Time (OFAT)

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