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Biodegradation of Chlorpyrifos in Real Wastewater by Acromobacter xylosoxidans SRK5 Immobilized in Calcium Alginate

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Abstract : Agrochemical industries produce huge amount of wastewater containing pesticides and other harmful residues. Environmental regulations make it compulsory to bring pesticides to a minimum level before releasing wastewater from industrial units.The present study was designed with the objective to investigate biodegradation of CP in real wastewater using bacterial cells immobilized in calcium alginate. Bacterial strain identified as Acromobacter xylosoxidans SRK5 (KT013092) using 16S rRNA nucleotide sequence analysis was used. SRK5 was immobilized in calcium alginate to make calcium alginate microspheres (CAMs). Real wastewater from industry having 50 mg L^{-1} of CP was inoculated with free cells or CAMs and incubated for 96 h at 37˚C. CP removal efficiency with CAMs was 98% after 72 h of incubation, and no lag phase was observed. With free cells, 12h of lag phase was observed. After 96 h of incubation 87% of CP removal was observed when inoculated with free cells. No adsorption was observed on vacant CAMs. Phytotoxicity assay demonstrated considerable loss in toxicity. Almost complete COD removal was achieved at 96 h with CAMs. Study suggests the use of immobilized cells of SRK5 for bioaugmentation of industrial wastewater for CP degradation instead of free cells.

Keywords : biodegradation, chlorpyrifos, immobilization, wastewater
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