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**Biodegradation of an actual Petroleum Wastewater in a Packed Bed Reactor by
an Immobilized Biomass of *Bacillus cereus***

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Abstract

Biodegradation of an actual petroleum wastewater sample collected from an oil refinery site in Guwahati, India has been carried out in a packed bed reactor (PBR) by *Bacillus cereus* (AKG1 MTCC9817 and AKG2 MTCC9818) strains immobilized in the calcium-alginate beads. The biodegradation of petroleum wastewater has also been performed by biofilm of the isolated *B. cereus* strains grown on the polyurethane foam (PUF). The performances of both the systems have been evaluated by measuring the chemical oxygen demand (COD), total organic carbon (TOC), concentration of phenolic compounds, total phosphate-phosphorus ($\text{PO}_4^{3-}\text{-P}$) and ammonium-nitrogen ($\text{NH}_4^+\text{-N}$) levels in the wastewater during the microbial treatment. The initial COD of 9200 mg/L, TOC of 4548 mg/L, phenolics of 3561 mg/L, $\text{PO}_4^{3-}\text{-P}$ of 121.1 mg/L and $\text{NH}_4^+\text{-N}$ of 121.09 mg/L were reduced to 70 mg/L, 184.97 mg/L, 8 mg/L, 67.3 mg/L and 61.3 mg/L, respectively as a result of biodegradation in the PBR with alginate beads. On the other hand, treatment in the PUF-based PBR led to a final COD, TOC, phenolics, $\text{PO}_4^{3-}\text{-P}$ and $\text{NH}_4^+\text{-N}$ level of 830 mg/L, 545.64 mg/L, 303 mg/L, 89.8 mg/L and 69.3 mg/L, respectively. Overall, present results demonstrated the successful implication of immobilized AKG1 and AKG2 in treating petroleum wastewater in the PBRs.

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