

## **Growth kinetics of a diesel-degrading bacterial strain from petroleum-contaminated soil**

### **Abstract**

A diesel-degrading bacterium was isolated from a diesel-contaminated site in Selangor, Malaysia. The isolate was tentatively identified as *Acinetobacter* sp. strain DRY12 based on partial 16S rDNA molecular phylogeny and Biolog® GN microplate panels and Microlog® database. Optimum growth occurred from 3 to 5% diesel and the strain was able to tolerate as high as 8% diesel. The optimal pH that supported growth of the bacterium was between pH 7.5 to 8.0. The isolate exhibited optimal growth in between 30 and 35° C. The best nitrogen source was potassium nitrate (between 0.6 and 0.9% (w/v)) followed by ammonium chloride, sodium nitrite and ammonium sulphate in descending order. An almost complete removal of diesel components was seen from the reduction in hydrocarbon peaks observed using Solid Phase Microextraction Gas Chromatography analysis after 10 days of incubation. The best growth kinetic model to fit experimental data was the Haldane model of substrate inhibiting growth with a correlation coefficient value of 0.97. The maximum growth rate-  $\mu_{max}$  was 0.039 hr<sup>-1</sup> while the saturation constant or half velocity constant  $K_s$  and inhibition constant  $K_i$ , were 0.387% and 4.46%, respectively. MATH assays showed that 75% of the bacterium was found in the hexadecane phase indicating that the bacterium was hydrophobic. The characteristics of this bacterium make it useful for bioremediation works in the Tropics.

### **Keywords**

*Acinetobacter* sp.; Characterization; Diesel-degrading; Haldane; Isolation