



Isolation and characterization of a novel paraffin wax-degrading bacterium, *Pseudomonas* sp strain PW-1, from petroleum-contaminated sites

Y.L. Zhang, Z. Liu, and T. Liu

Agricultural College, Heilongjiang Bayi Agricultural University,
Daqing, Heilongjiang, China

Corresponding author: T. Liu
E-mail: liutongamy@sina.com

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ABSTRACT. An isolate capable of degrading paraffin wax was isolated from petroleum-contaminated sites in Daqing, China, and identified as *Pseudomonas* sp strain PW-1 by analyzing the 16S rDNA sequence (GenBank accession No.: KF529529) as well as the biochemical and physiological characteristics. The optimized degradation conditions of the isolate were as follows: FeSO_4 metal ion concentration of 0.01 g, temperature of 30°C, $(\text{NH}_4)_2\text{SO}_4$ nitrogen source concentration of 1.5 g/L, and a carbon: nitrogen ratio of 10:1. Response surface methodology-based analysis of the culture time, inoculation amount, and initial pH of the medium revealed that the optimal theoretical conditions were a culture time of 11.16 days, inoculation amount of 3.13%, and an initial pH of 9.29. The theoretical degradation rate was up to 54.68% under the optimal conditions. Taking into account the experimental conditions of a laboratory, 11.2 days of cultivating time, 3% inoculum, and a medium initial pH of 9.3 were used in practical settings. Experimental results showed that the degradation rate of paraffin wax was 52.85%, which demonstrated that this strain could degrade 1050 mg paraffin wax, using it as the sole carbon source, in a

1000-mL minimal salts medium. These results indicate that the strain PW1 can be used for application in oil wells with paraffin deposition problems in order to enhance oil recovery.

Key words: Paraffin wax; *Pseudomonas* sp; Degradation conditions; Response surface methodology; Potential bacteria