

Heterocyclic compounds degradation and characterization of Antarctic psychrophilic bacteria strain BS1

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Heterocyclic compounds such as carbazole (CAR), dibenzofuran (DBF), and dibenzothiophene (DBT) are detected in petroleum-contaminated soil and seawater along with their decomposition products. Among them, CAR which is highly in demand as industrial raw materials for pharmaceuticals and plastics has been confirmed to be carcinogenic and mutagenic. For this reason, it is necessary to remove these compounds from the environment, but the physical methods are costly and have secondary processing problems. Therefore, bioremediation approaches should be used as they are relatively low cost with low environmental impact.

Currently, many studies report on degradation of CAR using bacteria that were effective at relatively warm temperatures, but information on psychrophilic bacteria are scarce. In addition, environmental pollution occurs in cold regions as well as in warm regions, and it is necessary to develop bioremediation in such environments. Therefore, the purpose of this study is to isolate and study bacteria from Antarctic soils for bioremediation in cold environments.

The strain isolated for this study is designated as strain BS1. This strain was isolated from soil near the Chile Base in Antarctica. BS1 strain was isolated from the Antarctic soil by enrichment culture method. The strain was confirmed to have CAR-degrading ability by growth was confirmed with MSM containing 0.1% CAR as sole carbon source. The 16S rRNA sequence analysis showed 99% homology with *Pseudomonas*. Therefore, it is considered that the strain BS1 is a cold-adapted bacterium belonging to the genus *Pseudomonas*.

Growth test was conducted at 5 to 45 °C and it was found that strain BS1 only grew at temperatures from 5 to 35 °C, while *E. coli* (control) grew at 20 to 45 °C. Therefore, it was verified that strain BS1 can grow well in low temperature environment. Further studies on strain BS1 will lead to more understanding for application of bioremediation in the future.