

## **Effects of heavy metals on diesel metabolism of psychrotolerant strains of *Arthrobacter* sp. from Antarctica**

### **ABSTRACT**

**Aim:** This present study aimed at examining the ability of cold-adapted Antarctic bacteria to tolerate and degrade diesel in the presence of different types of heavy metal co-pollutants. **Methodology:** *Arthrobacter* sp. strains AQ5-05 and AQ5-06, originally isolated from Antarctic soils, were grown on Bushnell-Haas medium containing 1 ppm of heavy metal ions (As, Ag, Cd, Co, Cu, Cr, Hg, Ni, and Pb) supplemented with 3% (v/v) diesel. Diesel degradation was determined gravimetrically, while bacterial growth was evaluated by measuring the optical density of media (OD<sub>600</sub> nm). **Results:** In the absence of heavy metal ions, strain AQ5-06 achieved 37.5% diesel mineralisation, while strain AQ5-05 achieved 34.5%. The diesel degrading abilities of both strains were significantly inhibited by exposure to < 1 ppm of Ag or Hg. In contrast, no change in degradation ability was observed using other tested heavy metals. The IC<sub>50</sub> of Ag and Hg on diesel degradation by the two strains were (0.2 and 0.4 ppm) and (0.3 and 0.2 ppm), respectively. **Interpretation:** *Arthrobacter* sp. Strains AQ5-05 and AQ5-06 may contain genes for alkane degradation and heavy metal resistance for remediating diesel-polluted soil in Antarctic and other cold regions.

**Keyword:** Antarctica; *Arthrobacter* sp; Biodegradation; Diesel; Heavy metals