

Effect of heavy metals and other xenobiotics on biodegradation of waste canola oil by cold-adapted *Rhodococcus* sp. strain AQ5-07

ABSTRACT

The Antarctic is generally considered to be one of the most pristine areas in the world. However, both long and short-range pollutants are now known to be present in the Antarctic environment. Canola oil is an example of a polluting hydrocarbon that can be accidentally released into the Antarctic environment in oil wastewater treatment plants. The Antarctic soil bacterial strain *Rhodococcus* sp. AQ5-07, known to be capable of using waste canola oil (WCO) as its sole source of carbon, was tested for its ability to degrade canola oil in the presence of different heavy metals and xenobiotics. *Rhodococcus* sp. AQ5-07 was grown on minimum salt media containing different heavy metals (Zn, Co, Ni, Ag, Pb, Cu, Cr, Hg, Cd and As), xenobiotics (acrylamide and phenol) supplemented with 3% WCO. Three out of the 10 heavy metals tested (Hg, Cd and Ag) led a significant reduction in canola oil degradation at a concentration of 1 ppm. The IC₅₀ values of Hg, Cd and Ag were 0.38, 0.45 and 0.32 ppm, respectively. The strain could also withstand 10 mg/L acrylamide, 50 mg/L phenol and 0.5% (v/v) diesel. This study confirmed the ability of *Rhodococcus* sp. AQ5-07 to degrade canola oil in the presence of various heavy metals and other xenobiotics, supporting its potential use in bioremediation of vegetable oil and wastewater treatments in low temperature environments.

Keyword: Arctica; Biodegradation; Canola oil; Heavy metals; *Rhodococcus*; Xenobiotics