

Resistance of *Pseudomonas putida* JYR-1 to High Concentrations of Halogenated Aliphatic Compounds

Ji-Young Ryu¹, Suil Kang² and Hor-Gil Hur^{1,2}

Department of Environmental Science and Engineering,¹ and International Environmental Research Center, Gwangju Institute of Science and Technology, Gwangju, Republic of Korea²

Tel: (062) 970 - 2437, Fax: (062) 970 - 2434

Abstract

Pseudomonas putida JYR-1,¹⁾ and *Burkholderia cepacia* G4,²⁾ which can metabolize *trans*-anethole via anethole epoxides and toluene via *o*-cresol respectively, were tested their tolerance to halogenated C2 and C3 compounds. The halogenated compounds such as trichloroethene, tetrachloroethene, 1,2-dichloroethane, and etc., have been wide discharged into, and stably stayed in the environments. Nine representative chlorinated compounds, 1,2-dichloroethane, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,1-dichloroethene (DCE), 1,2-*trans*-dichloroethene (*trans*-DCE), 1,2-*cis*-dichloroethene (*cis*-DCE), trichloroethene (TCE), tetrachloroethene (PCE) and 1,2,3-trichloropropane (TCP) were tested. Three different levels of concentrations (0, 5, 10 mM) were added to the mineral salt basal medium containing 5 mM glucose. The optical density of the bacterial cultures at 600 nm was measured during incubation. *P. putida* JYR-1 grew on the medium with concentrations of 5 mM of the chlorinated compounds without growth inhibition as comparing to the growth of the strain in the medium without adding the chlorinated compounds. Surprisingly, strain JYR-1 grew in the medium with concentrations of up to 10 mM TCE and PCE with doubling times 5.4 h, and 5.4 h and lag phase times 60 h, and 80 h, respectively, which were increased compared to the control experiments. Although *B. cepacia* G4 strain did grow in the medium with concentrations of 5 mM of 1,2-dichloroethane, 1,1,1-trichloroethane, DCE, *trans*-DCE, and *cis*-DCE without inhibition, it did not show growth in the medium with concentrations of 5 mM of 1,1,2-trichloroethane, TCE, PCE, and TCP. *P. putida* JYR-1 was more resistant to the chlorinated aliphatic C2 and C3 compounds tested than *B. cepacia* G4. Therefore, this bacterium as a host strain will be more likely applicable for the genetic manipulation to biodegrade highly concentrated chlorinated aliphatic solvents.

References

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