

Guzik, U., Wojcieszynska, D., Gren, I., Hupert-Kocurek, K. Activity of Catechol Dioxygenases in the Presence of Some Heavy Metal Ions: Bioremediation of an Environment Polluted with Aromatic Compounds. *Ochrona Srodowiska* 2010, Vol. 32, No. 1, pp. 9–13.

Abstract: The strains of *Stenotrophomonas maltophilia* KB2 and *Pseudomonas putida* N6 are characterized by an enhanced capacity for degrading aromatic compounds: within five hours of incubation both the strains were found to provide a complete degradation of phenol (3 mmol/dm³). Upon induction with phenol, catechol 2,3-dioxygenase, an enzyme responsible for the meta-cleavage of aromatic compounds, was detected in the *Stenotrophomonas maltophilia* KB2 strain, whereas in the *Pseudomonas putida* N6 strain the presence was revealed of catechol 1,2-dioxygenase, an enzyme characteristic of the pathway for the ortho-fission of the aromatic ring. Tests on the sensitivity of the enzymes to metal ions have demonstrated that Zn²⁺ ions activated catechol 2,3-dioxygenase in the KB2 strain. The other metal ions were found to be inhibitors of this enzyme. Among the metal ions tested, the Cu²⁺ ion was the strongest inhibitor of the two isolated dioxygenases. Slightly weaker was the inhibition of catechol 1,2-dioxygenase induced by Cd²⁺ and Zn²⁺ ions in the N6 strain. The activity of this enzyme increased in the presence of Co²⁺ ions. The other ions had no significant influence on the activity of the catechol 1,2-dioxygenase isolated from the N6 strain. The partial activity of both dioxygenases observed upon the application of metal salts suggests that both the strains, *Stenotrophomonas maltophilia* KB2 and *Pseudomonas putida* N6, may contribute much to the remediation of an environment polluted with aromatic compounds.

Keywords: Biodegradation, bioremediation, *Stenotrophomonas maltophilia* KB2, *Pseudomonas putida* N6, metal ions.