

Robak, M., Boruczowski, T., Drozd, W., Lazar, Z., Baranowska, M., Przado, D., Steininger M. Application of the Yeasts *Yarrowia lipolytica* for *in-situ* Bioremediation of Soil Contaminated with Creosote Oil – A Case Study. *Ochrona Srodowiska* 2011, Vol. 33, No. 2, pp. 27–33.

Abstract: Creosote-contaminated soil samples collected within the premises of a timber processing plant were made the subject to microbiological and chemical analysis. An area of approximately 0.12 ha was chosen for *in-situ* bioremediation involving an autochthonous *Yarrowia lipolytica* yeast species. Use was made of three yeast preparations: cells immobilized in sodium alginate or starch, and yeast suspensions. The number of yeast cells introduced into the soil approached $2 \cdot 10^{12}$ (238 g). The results obtained have revealed substantial improvement in the soil structure and noticeable reduction in the concentrations of the particular contaminants detected in this area. During nine months of bioremediation, the total content of polycyclic aromatic hydrocarbons decreased threefold, but a significant increase was observed in the concentration of anthracene. Contamination with creosote oil, expressed as the level of total petroleum hydrocarbons, was reduced by about 70% in the area treated with sodium-alginate-immobilized yeasts, and by more than 33% over the entire area examined. The introduction of immobilized *Y. lipolytica* biomass enriched the eukariotic microflora of the soil, improving the proportion of bacterial counts to the counts of yeasts and those of mould. Apart from the strains of *Y. lipolytica*, another two yeast species were isolated from and identified in the soil being bioremediated – *Rhodotorula glutinis* and *Cryptococcus albidus*.

Keywords: Bioremediation, *in situ*, yeast, *Yarrowia lipolytica*.