

## Genetic and physiological manipulations in bacterial degraders of aromatic pollutants and their application

The aim of this project is to develop a system of construction and use of bacterial degraders of aromatic pollutants. Genetic manipulations, biofilms carriers including original nanostructures and humic substances were used to improve biodegradation effectiveness under real conditions. The project consortium is composed by teams from basic and applied research (The Institute of Microbiology, Academy of Science of the Czech Republic (project coordinator), The Technical University of Liberec, and The Institute of Chemical Technology in Prague) as well as business teams (DEKONTA, Co., MikroChem LKT, XX). The project is solved from 2008 to 2011.

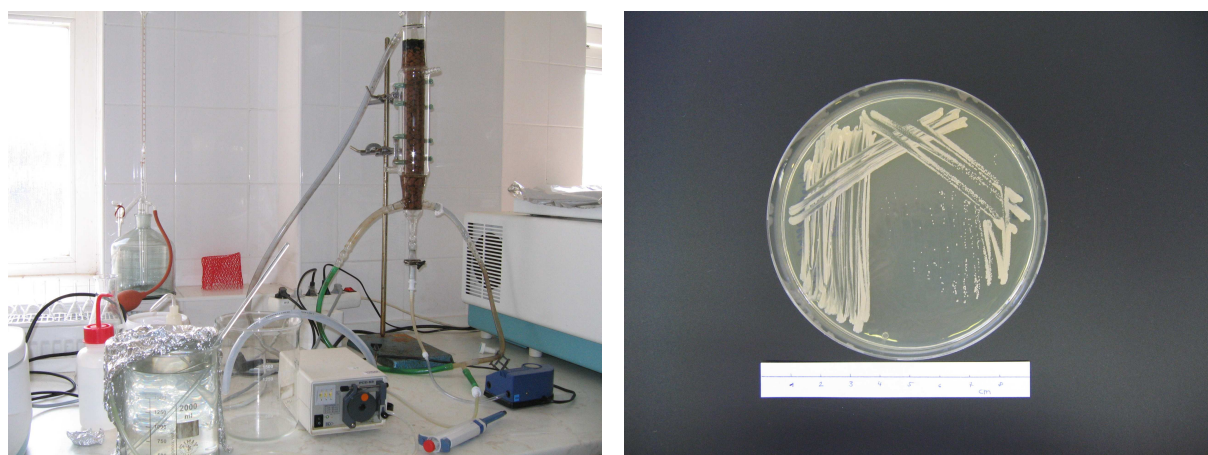
DEKONTA, Co. deals with testing of wild and subsequently physiologically or genetically modified strains in real contaminated matrices (industrial wastewater, contaminated soil) in laboratory scale. The biodegradation efficiencies of autochthonous microorganisms, wild strains and their modifications are compared. In case of positive statements of state administration bodies DEKONTA, Co. will perform following pilot testing verifying a pollutant removal efficiency of selected bacterial strain (strains).

Today, DEKONTA, Co. is testing biodegradation efficiencies of *R. erythropolis* CCM 2595, *R. jostii* RHA1 a genetically modified strain *R. erythropolis* pSRKcatRABC (with improved phenol degradation pathway). The biodegradation of phenol and polycyclic aromatic hydrocarbons is carried out in contaminated wastewater and biodegradation of phenol (together with phenol derivatives) and chlorobenzenes is carried out in contaminated soil. The highest removal efficiency is observed for *R. jostii* RHA1. Other laboratory tests with constructed modified strains will be carried out after evaluation of abovementioned experiments. They will be aimed at selection a proper strain for the pilot testing.

### Acknowledgement

The project is co-financed by the Czech Ministry of Education, Youth and Sports (Project No. 2B08062).

### Figures



**Fig. 1:** Left – a laboratory column filled with ceramic clay for a continuous phenol biodegradation. Right – *Rhodococcus erythropolis* RHA1.