



## **Biostimulation of the autochthonous bacterial community and bioaugmentation of selected bacterial strains for the depletion of Polycyclic Aromatic Hydrocarbons in a historically contaminated soil**

Simona DiGregorio (1), Monica Ruffini Castiglione (1), Alessandro Gentini (2), and Roberto Lorenzi (1)

(1) Department of Biology, University of Pisa, Italy (sdigregorio@biologia.unipi.it), (2) Teseco SpA, Via CL Raghianti, Ospedaletto, Pisa, Italy

Polycyclic aromatic hydrocarbons (PAHs) are a large group of organic contaminants causing hazards to organisms including humans.

The objective of the study was

(1) to validate the biostimulation of the autochthonous bacterial population by the amendment of lignocellulosic matrices inoculated with white rot fungi, to be exploited for the depletion of PAHs (5687 ppm) in a historical contaminated soil.

(2) to validate the isolation of autochthonous bacterial strains capable to use PAHs as sole carbon source and their massive bioaugmentation for PAH depletion in a historical contaminated soil.

The validation has been performed at mesocosm and pilot scale (7 tons of soil in a biopile).

The two approaches end up with the complete depletion of the PAHs. A genotoxicological assessment of the process and of the soil at the end of the process of decontamination has been performed. The process of soil decontamination showed an increase in the genotoxicity of either the soil and the deriving elutriates. The bioaugmentation of selected bacterial strains determined the complete detoxification of the decontaminated soil after 21 weeks. The microbial ecology of the system during the process of decontamination has been monitored.