**Università degli Studi di Napoli Federico II**

**PhD in Biotechnology - 38th cycle**

**Dr. Margherita Castaldo**

# Identification and assessment of alternative pathways for bioremediation of aromatic polyhalogenated compounds polluted matrices

**Tutor(s):** Daria Maria Monti, Maurilia Maria Monti, Paolo Alfonso Pedata

**Department:** Department of Chemical Sciences, IPSP- CNR

Anthropic activities are polluting Earth resources. Soil is one of the most exposed compartments to pollution, because of the introduction of xenobiotic compounds, whose degradation is difficult. Recalcitrant pollutants are often highly toxic and carcinogenic, and undergo bioaccumulation and biomagnification along the food chain, becoming even more hazardous. Among xenobiotics, Pentachlorophenol (PCP) is one of the most recalcitrant chemicals polluting the environment, because of the presence of a stable aromatic ring and its chlorinated content. The main way to eliminate PCP from the environment is through biodegradation by microorganism (Lopez– Echartea et al., 2016), but - due to the presence of five chlorine atoms on the phenol ring- PCP is more resistant to bacterial degradation than less chlorinated analogues (Arora et al., 2014). Thus, the use of microorganisms is limited by certain growth conditions and mostly by the production of the enzymes involved. One approach for increasing the rate of detoxification would be searching for catabolic pathways in alternative organisms, such as insects. Indeed, they represent a relatively unexplored source of enzymes, thanks to their genetic plasticity.

To survive in a chemically unfriendly environment, insects have developed strong and versatile detoxification responses (Terriere, 1984), that could depend on the production of insect enzymes, but also directly or indirectly on their symbiotic microbes. The objective of the present PhD project is to find new sources of enzymes to be used for bioremediation of PCP polluted matrices. The project starts from using a *Drosophila melanogaster* PCP resistant strain to discover new catabolic pathways and to identify new active molecules useful in PCP detoxification processes.

**References**

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