DESCRIPTION FOR THE GENERAL PUBLIC

Non-steroidal anti-inflammatory drugs (NSAIDs) are a diverse group of pharmaceuticals with analgesic, anti-inflammatory and antipyretic properties. The most commonly used active substances are ibuprofen, paracetamol, diclofenac and naproxen. Increasing consumption of analgesics and the lack of the optimal in terms of chemical conditions and costs modern methods of wastewater treatment directed at this group of micropollutants results in their presence in the natural environment. Due to their properties, NSAIDs accumulate in soil, bottom sediments and aquatic organisms negatively influencing their vitality and reproduction success. One of the most promising methods used for treatment of wastewater containing pharmaceuticals is the removal of contaminants with the use of microorganisms with a naturally increased degradation potential. However, the use of bacterial strains in wastewater treatment entails the need to revealed the metabolic pathways and molecular mechanisms associated with the degradation of various pollutants. **One of the most important compounds detected in both drinking water and treated wastewater is diclofenac, characterized by high toxicity and polycyclic aromatic structure, which determines its low susceptibility to biodegradation.** Due to its prevalence in the environment, diclofenac is considered as a marker of anthropological pollution and placed on the list of substances intended for monitoring by the European Union.

The aim of the project is to investigate the diclofenac degradation pathway by *Pseudomonas* strain with increased degradative abilities of aromatic compounds, e.g. paracetamol and 4-aminophenol. So far, in the world literature, the microbial pathway of diclofenac degradation remains unknown. The combination of modern methods of liquid chromatography, gas chromatography with mass spectrometry and analysis of enzymes activity potentially involved in the decomposition of aromatic compounds, allows to identify metabolites formed during degradation. Identification of intermediates, in combination with the activity of the most important bacterial enzymes responsible for degradation allows to propose a metabolic pathway of the test compound decomposition.

The implementation of the project will significantly contribute to the increase of knowledge about processes related to the degradation of micro-pollutants as well as the development of scientific discipline. The research topics concerning the cleaning-up of the environment, in particular non-invasive, cheap and effective biological methods, are in line with trends in research and scientific world literature.