PhD Topic Announcement

Title: Development of enzyme catalytic wastewater treatment method to remove organic micropollutants

Research field: environmental enginnering, biotechnology

Name of Doctoral School: Doctoral School of Chemical Engineering and Material Sciences

Institute: University of Pannonia

Thesis supervisor: Dr Mónika Meiczinger, Dr Viola Somogyi
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Description of the research topic: (max 1500 characters)

Municipal wastewater treatment plants face the challenges of needing to simultaneously treat macronutrients and contaminants such as cosmetics, detergents and pesticides present in low concentrations that are of serious risk to the environment due to their toxic effects. Some enzymes, such as oxidoreductases, are capable of converting these organic micropollutants in free or immobilised forms. Nonetheless, the cost of producing these enzymes and their short lifespan pose an obstacle for the process to become widespread in municipal wastewater treatment. Instead of producing purified enzymes, a solution to make the technology more attractive may be the use of partially purified enzymes along with the development of different immobilisation techniques. The aim of the PhD work is to develop an easy-to-use enzyme-catalytic wastewater treatment method that can effectively remove the above mentioned micropollutants from various types of wastewater. To this end, as a continuation of previous work the combined effects of different enzymes (laccase, horseradish peroxidase) are to be investigated, along with what other enzymes could be involved in the tests to improve the degradability of persistent impurities. In order to increase the life span and facilitate the usability enzymes, various immobilization methods are going to be examined and their effect on the enzyme functionality will be tested.

Required language skills: English - fluent

Further requirements: MSc in Chemical Engineering, Environmental Engineering or Biotechnology, background in analytical measurements (HPLC, GC…)