

Master Thesis Subjects (Process Engineering and Environmental Protection PEEP)

planned date of master thesis defence in 2022/2023

Institute of Environmental Protection and Engineering

Promotor	Temat pracy dyplomowej	Krótką charakterystyką pracy	Experimental work	Short description of the experiment
dr hab. inż. Katarzyna Bernat, prof. UWM	Biomethane potential during co-digestion of organic substrates	The aim of the study is to compare the methane potential of the 2-component organic substrates at two temperature conditions	YES	The study will be carried out in the Automatic Methane Potential Test System that has become the research-standard analytical tool for anaerobic batch fermentation testing. Methane potential will be determined for the 2-component mixture of organic substrates. Two temperatures will be used: mesophilic and thermophilic conditions.
prof. dr hab. inż. Paweł Brzuzan	Selected synthetic RNA ligands as putative inducers of oxidative stress in hepatoma cell lines	(keywords: anti-cancer substances; tests based on the Huh7 cell line (hepatoma); reporter method (luciferase); medical chemistry; RNA) The aim of the research is to screen a library of synthetic RNA ligands for ability to induce oxidative stress.	YES	1. Exposure of the human hepatoma Huh7 cell line to a series of synthetic RNA ligands of known structure and characteristics. 2. Determination of Reactive oxygen species (ROS) level, cell survival.
dr hab. inż. Katarzyna Bulkowska	The hydrogen production from agricultural waste	The aim of the experiments will be determine the biogas/hydrogen production from agricultural waste. The work will be focuses on the optimization of operational conditions like organic loading rate and hydraulic retention time.	YES	The experiments will be conducted in the CSTR reactors. Student will be analyze the feedstocks, digestate, biogas production and hydrogen content. The main analysis are: total solids, volatile solids, COD, ammonium nitrogen, volatile fatty acids and orthophosphates concentration.
dr. hab. inż. Agnieszka Cydzik-Kwiatkowska, prof. UWM	Seasonal variations of microbial community in full-scale wastewater treatment plant with aerobic granules	In the study, biomass sampled from a full-scale facility with aerobic granular sludge will be used to investigate changes in species composition depending on the seasonal temperature variations	YES	In the study, basic physico-chemical analyzes of wastewater and biomass will be performed. From the biomass DNA will be isolated and subjected to next-generation sequencing. The results of sequencing will be analyzed bioinformatically. Analysis of freshly sampled wastewater and biomass. Isolation of DNA from frozen samples collected throughout the year.
dr hab. inż. Zygmunt Mariusz Gusiain	The effect of ball milling on the biochar properties and metal sorption from aqueous solutions	The aim of this study will be determination the impact of selected methods of biochar modification on its physical and chemical properties and on the immobilization of metals, properties and phytotoxicity of remediated soil	YES	In the experiment, characteristics of biochar modified with ball milling (e.g. effect of different speed, duration etc.) will be determined. Batch sorption experiments will be performed to estimate sorption capacity of biochar for selected heavy metal, depending on different operational conditions. Finally, stability of adsorbed metals onto biochar will be determined.
dr inż. Sławomir Kasinśki	Recycling vs energy recovery - towards the Circular Economy	The aim of the study is to compare the environmental benefits of material and energy recovery of selected groups of municipal waste. The work is based on the available scientific literature and free LCA programs.	No	Theoretical work
dr hab. inż. Dorota Kulikowska, prof. UWM	Molecular weight distribution of organics in landfill leachate	Molecular weight (MW) distributions of organics present in landfill leachate will be investigated. Refractory organics present in leachate may pose an environmental risk. Identification of refractory components and insights into the molecular weight of the organics are essential for the development of efficient treatment methods.	YES	Experiment will be conducted in laboratory conditions with the use of real landfill leachate. Each fraction will be analysed in terms of TOC. Moreover, biodegradability of organics will be assessed
dr hab.inż. Tomasz Pokój, prof. UWM	Phosphorus recovery from sewage sludge by struvite precipitation	The aim of the study is determine the optimal conditions for struvite precipitation from sewage sludge hydrolysates. The scope of the research includes the determination of the optimal time of sludge hydrolysis for the assumed pH and the recovery of phosphorus in the form of struvite from the obtained hydrolysates using different sources of magnesium, with a variable molar ratio of Mg: N: P and the reaction.	YES	Carrying out experiments for the hydrolysis of sewage sludge; preparation of a hydrolyzate for optimal hydrolysis conditions; performing struvite precipitation experiments for variable initial conditions; sampling at various intervals; analytical control of the process; The scope of physico-chemical analyzes includes: pH, COD, TOC, ammonium nitrogen, Kjeldahl nitrogen, orthophosphates, total phosphorus, dry matter and dry organic matter of sludge.
prof. dr hab. inż. Irena Wojnowska-Baryła	Comparison of the effectiveness of selected activated sludge systems	On the basis of operational conditions and literature data, the assessment of the effectiveness of the carbon, nitrogen and phosphorus removal by activated sludge depending on the technological and technical solutions.	NO	
dr hab. inż. Maciej Woźny, prof. UWM	Fitotoxicity assessment of post-extraction solutions used for soil remediation	The aim of research is to assess the effect of post-extraction solutions used for soil remediation on germination and growth of selected plant species	YES	Fitotoxicity assessment of post-extraction solutions used for soil remediation
dr hab. inż. Magdalena Zielińska, prof. UWM	The use of membrane filtration for the treatment of selected wastewater	The aim of the work will be to demonstrate the effect of the membrane cut-off and transmembrane pressure on the efficiency of pollutant removal from the selected type of wastewater and on the hydraulic efficiency of the membrane module.	YES	