załącznik nr 5

TEMATY PRAC DYPLOMOWYCH
planowany termin obrony rok akademicki 2026/2027
Kierunek studiów: Inżynieria Środowiska Biotechnology
poziom studiów: studia II stopnia

Instytut	Katedra	Rodzaj pracy (MGR)	Promotor	Temat pracy dyplomowej	Krótka charakterystyka pracy	Dotyczy tylko pracy magisterskiej	
						Praca eksperymentalna (TAK/NIE)	Krótki opis eksperymentu
Instytut Inżynierii i Ochrony Środowiska	Katedra Biotechnologii w Ochronie Środowiska	MGR	prof. dr hab. inż. Katarzyna Bernat	The value of organic waste products as a substrates for biomethane production in the contex of its value in circular economy	The aim of the study is to compare the methane potential of the different organic substrates without and after the chosen pretreatment method at mesophilic anaerobic condition	TAK	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 different organic substrates. Pretreatment step will be used prior anaerobic digestion in order to determine the impact of pretreatment on methane production.
Instytut Inżynierii i Ochrony Środowiska	Katedra Biotechnologii w Ochronie Środowiska	MGR	dr inż. Katarzyna Bułkowska, prof. UWM	Process Optimization of Methane Fermentation of Agricultural Waste in Laboratory-Scale Reactors	The aim of this thesis is to comprehensively analyze substrates and digestates obtained from methane fermentation of agricultural substrates, with emphasis on its biochemical composition.	TAK	Scope will include: selection and characterization of agricultural waste substrates, laboratory-scale methane fermentation in controlled anaerobic reactors, monitoring of process parameters, comparative analysis of methane yields under different operational conditions, technical evaluation of the most effective process setup.
Instytut Inżynierii i Ochrony Środowiska	Katedra Biotechnologii w Ochronie Środowiska	MGR	prof. da hab. inż. Paweł Brzuzan	Ocena cytotoksyczności ekstraktów glebowych pochodzących z remediacji	Ocenie cytotoksyczności poddane zostaną wybrane ekstrakty glebowe. Analizowane będą wskaźniki przeżywalności i stresu oksydacyjnego wobec komórek ludzkiej hepatomy, Huh7.	TAK	Przygotowanie komórek, ekspozycji na ekstrakty oraz analiza wskaźników cytotoksyczności z użyciem bioluminometru.
Instytut Inżynierii i Ochrony Środowiska	Katedra Biotechnologii w Ochronie Środowiska	MGR	prof. dr hab. inż. Sławomir Ciesielski	Organic wastes as a substrates for biosurfactants production	This study aims to analyze the potential of various substrates for microbial biosurfactant production.	TAK	Bacteria will be cultivated in a growth medium containing specific carbon and nitrogen sources under controlled conditions. During fermentation, the production of biosurfactants will bemonitored by measuring surface tension reduction and other relevant parameters. At the end of the cultivation period, biosurfactants will be extracted from the culture broth using a precipitation method. The extracted biosurfactants will be then purified to remove impurities and obtain a concentrated product. Finally, the produced biosurfactants will be characterized by analyzing their chemical composition, surface activity, and other relevant properties.
Instytut Inżynierii i Ochrony Środowiska	Katedra Biotechnologii w Ochronie Środowiska	MGR	prof. dr hab. inż. Agnieszka Cydzik-Kwiatkowska	The effect of aerobic granule size on the kinetics of nitrogen compound transformations	The aim of the study is to assess the effect of size of aerobic granules on the nitrogen conversions in wastewater	TAK	Aerobic granules collected from a full-scale installation will be separated into size fractions. For each fraction, the kinetics of nitrogen compound conversions will be determined. Laboratory wastewater tests will be carried out using standard analytical methods.
Instytut Inżynierii i Ochrony Środowiska	Katedra Biotechnologii w Ochronie Środowiska	MGR	dr hab. inż. Mariusz Gusiatin, prof. UWM	Screening of biochars derived from sewage sludge co-pyrolysis for metal adsorption and their immobilization	The aim of this study is evaluation how biochars from co-pyrolysis of sewage sludge with diffrent co-substrates affect metal adsorption capacity and mechanism of their immobilization.	TAK	Biochars derived from co-pyrolysis of sewage sludge with different co-substrates of agricultural and forest origin will be characterized. Selected metals will be used for batch adsorption test. Distribution of adsorbed metals onto biochars will be determined as well as mechanisms of their immobilization. Based on the obtained results the remediation potential of tested biochars will be evaluated.
Instytut Inżynierii i Ochrony Środowiska	Katedra Biotechnologii w Ochronie Środowiska	MGR	dr inż. Sławomir Kasiński	Analysis of the potential use of selectively collected kitchen waste for biogas production under mesophilic and thermophilic fermentation conditions	The study will analyze the potential use of selectively collected kitchen waste as a substrate for biogas production through anaerobic digestion. The research will include a comparison of process efficiency under mesophilic (approx. 37 °C) and thermophilic (approx. 55 °C) conditions, taking into account parameters such as the volume of produced biogas, methane content, reduction of volatile solids, and process stability. The aim of the thesis is to determine which of the examined temperature regimes ensures higher energy efficiency and process stability, as well as to evaluate the resource potential of kitchen waste in the context of the Circular Economy.	TAK	The experiment will be carried out under laboratory conditions using two sets of anaerobic fermentation reactors with a working volume of 4–6 dm^3, equipped with a temperature control system and biogas volume measurement. The substrate will consist of shredded, selectively collected kitchen waste, pre-homogenized and analyzed for total solids (TS) and volatile solids (VS) content. The reactors will operate in parallel under mesophilic (37 ± 1 °C) and thermophilic (55 ± 1 °C) conditions, with a comparable organic loading rate (OLR). During the process, measurements of biogas volume and composition (CH_4, CO_2), as well as monitoring of pH, alkalinity, and volatile fatty acids (VFAs) will be conducted. After completion of the process, the reduction of volatile solids and methane yield (L CH_4/kg VS) will be determined. The results will be used to compare the efficiency of anaerobic digestion under both temperature regimes and to assess the suitability of kitchen biowaste as an energy substrate in local biogas production systems.
Instytut Inżynierii i Ochrony Środowiska	Katedra Biotechnologii w Ochronie Środowiska	MGR	dr hab. inż. Tomasz Pokój, prof. uczelni	Phosphorus and nitrogen 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.	TAK	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.
Instytut Inżynierii i Ochrony Środowiska	Katedra Biotechnologii w Ochronie Środowiska	MGR	dr hab. inż. Magdalena Zielińska, prof. UWM	Bisphenols (BP) in wastewater – the fate of BPA, BPF and BPS at individual stages of wastewater treatment and sewage sludge processing; concept of wastewater treatment technology with BP removal	The aim of this study is to identify the sources of selected BPs in wastewater, describe the mechanisms of their removal, analyze the removal efficiency at individual stages of wastewater treatment and sewage sludge processing, and develop a technological concept for a wastewater treatment plant with BP removal. This is a combination of review work and development of a technological concept.	TAK	The experiment will consist of developing a technology concept and performing the necessary technological calculations.