



Master's Final Project Proposals 2023/2024

Code	MEA-23/24-001
Title	Application of ozone-based processes for micropollutants removal from water.
Objectives	Wastewater treatment plants are not specifically designed to remove micropollutants such as pesticides, pharmaceuticals, and microplastics. These substances can later appear in the drinking water supply, posing a threat to human health. Therefore, the objective of this project is to introduce ozone-based processes for the degradation of these micropollutants. Additionally, the use of suitable catalysts will be incorporated to further optimize the mineralization process.
Student work	The student's work encompasses various stages, beginning with a bibliographic search, followed by experimental research, including operation conditions study and water characterization. The utilization of analytical equipment is a crucial component, facilitating detailed examinations. Subsequently, the obtained data is subjected to analysis, leading to a comprehensive discussion of the results.
Subject Area (Effluent treatment; Solid Wastes and contaminated soils; Environmental Management)	Effluent treatment
Type (research or professional)	Research
Other comments	To carry out this project successfully, it is essential to have the availability to conduct experiments in the lab. This availability may be either in the morning or in the afternoon, with a half-day commitment.



Code	MEA-23/24-003
Title	Wastewater reuse for agriculture using nature-based solutions coupled to advanced oxidation processes.
Objectives	<p>The main objective of this work is to investigate the potential performance of a hybrid system based on nature-based solution and advanced oxidation process to remove micropollutants contained in wastewater.</p> <p>The specific objectives are:</p> <ol style="list-style-type: none"> 1. To study the effect of the wastewater matrix in the hybrid system. 2. To investigate the performance of micropollutant elimination in the hybrid system by the introduction of different residues in the nature-based solution. 3. To study the removal of recalcitrant micropollutants 4. To investigate the phytotoxicity of the treated effluents
Student work	<p>The main tasks to develop by the student are:</p> <ol style="list-style-type: none"> 1. Bibliographic research. 2. Assembly of a constructed wetland at lab-scale. 3. Laboratory experiments: constructed wetland operation and advanced oxidation processes experiments. 4. Data processing.
Subject Area (Effluent treatment; Solid Wastes and contaminated soils; Environmental Management)	Effluent treatment
Type (research or professional)	Research
Other comments	



Code	MEA-23/24-005
Title	Modified biochar and photocatalysis as a strategy in advanced oxidation processes
Objectives	Literature review of using the modified biochar as photocatalyst in advanced oxidation processes
Student work	Bibliographic research
Subject Area (Effluent treatment; Solid Wastes and contaminated soils; Environmental Management)	Effluent treatment
Type (research or professional)	Research
Other comments	



Code	MEA-23/24-006
Title	Study on the viability of applying modified hydrochar in photocatalysis
Objectives	Initial experimental study in the synthesis of modified hydrochar and its application as photocatalyst in advanced oxidation process
Student work	Experimental work
Subject Area (Effluent treatment; Solid Wastes and contaminated soils; Environmental Management)	Effluent treatment
Type (research or professional)	Research
Other comments	



Code	MEA-23/24-007
Title	Critical review of membrane processes for water purification
Objectives	Compare the membrane processes used for water purification
Student work	The student will have to do an extensive review of the literature regarding water purification
Subject Area (Effluent treatment; Solid Wastes and contaminated soils; Environmental Management)	Effluent treatment
Type (research or professional)	Research and professional
Other comments	Critical review of membrane processes for water purification



Code	MEA-23/24-008
Title	Solid-state fermentation as an alternative way to obtain marketable biostimulants using low-cost raw materials
Objectives	The main objective is to determine the feasibility of using solid-state fermentation as alternative approach (more sustainable and economical) to obtain plant growth-promoting rhizobacteria starting from proposed solid organic residues.
Student work	The student will develop his/her work in the framework of the AGRI-PROSUME project, which aims to address the production of biostimulants of proven interest for the agricultural sector by implementing a waste valorization perspective. Specifically, this work intends to obtain plant growth-promoting rhizobacteria (PGPR) biomass from a solid-state fermentation (SSF) system using agricultural residues as low-cost raw materials. The student will execute experiments at a lab scale on SSF systems to determine the efficiency of the proposed approach while monitoring the system through diverse physicochemical and microbiological parameters (e.g., pH, moisture content, reducing sugars, biomass, CFU, among others)
Subject Area (Effluent treatment; Solid Wastes and contaminated soils; Environmental Management)	Solid wastes
Type (research or professional)	Research
Other comments	BETA Tech Center counts with an 850 m2 laboratories infrastructure in Vic devoted to research and technology transfer in which the experimental part will be developed. Besides, BETA counts with dynamic respirometric systems specifically designed to monitor solid-state fermentation systems. The student will receive all the required training to perform the proposed work properly.