

Name:

Carla de Sousa Santos

Research Group (if relevant):

Thermodynamics and Environment

Research Centre (if relevant):

LSRE - Laboratory of Separation and Reaction Engineering and LCM - Laboratory of Catalysis and Materials

Department/School(s) (if relevant):

Chemical Engineering Department

College:

Faculty of Engineering of the University of Porto

Supervisor(s):

Vítor Jorge Pais Vilar (Supervisor)

Ana Isabel de Emílio Gomes (Co-supervisor)

Funding body:

Fundação para a Ciência e a Tecnologia (FCT) (2022.10796.BD)

Area (field) of study:

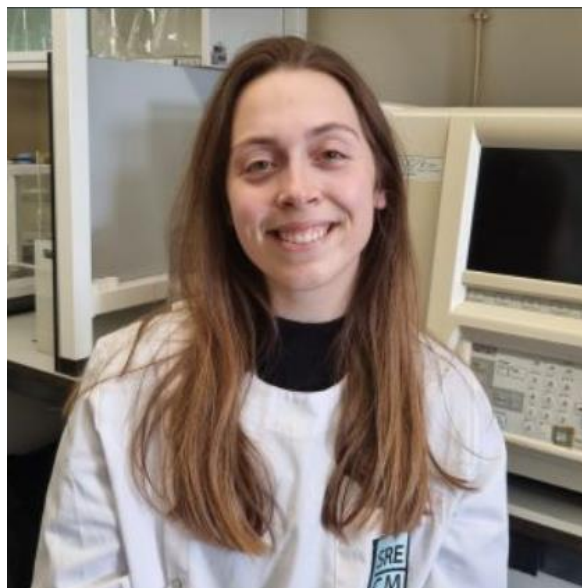
Removal of emerging contaminants in water by advanced oxidation processes

Thesis Title:

Multi-Barrier Approach for Wastewater Resources Recovery in Agriculture

Abstract:

The reuse of effluents from municipal wastewater treatment plants (MWWTPs) constitutes a significant and constantly available water resource that can be used for irrigation. However, MWWTPs face an increasing amount of contaminants of emerging concern (CECs) carrying a remarkably diverse threat to ecosystems and human health.



PhD Candidate Profile

The motivation of this project is to develop an integrated technology, based on a multi-barrier approach, to treat secondary wastewater from MWWTPs maximizing the reduction of CECs. Nanofiltration technology will be applied to reduce CECs in the permeate stream by at least 90% while retaining nutrients. Residual disinfection using chlorine dioxide will be added to the permeate used for crops irrigation in long-term tests. CECs in the polluted retentate stream will be reduced by at least 80% by light-driven advanced oxidation. When discharged into the aquatic system, it will contribute to improving the quality of the surface water body.

Collaborations: N/A

N/A

Publications: N/A

N/A

Presentations: N/A

1. Santos, Carla S.; Gomes, Ana I.; Vítor J.P. Vilar. "Tubular membrane photo-reactor for radial smart-dosing of iron (II) to promote photo-Fenton at neutral pH towards the removal of contaminants of emerging concern in urban wastewaters". In: 7th Latin-American Congress of Photocatalysis, Photochemistry and Photobiology - LACP3 2021, on-line meeting, chaired by Universidad Nacional Autónoma de México, 2021.
2. C. Santos, R. Montes, R. Rodil, J. B. Quintana, A. I. Gomes, V. J. P. Vilar: "Photo-Fenton at neutral pH with radial smart-dosing of Fe²⁺: Removal of contaminants of emerging concern from urban wastewaters". In: CIPOA 2022 - 5th Iberoamerican Conference on Advanced Oxidation Technologies, 2022, Cusco, Peru.
3. C. Santos, R. Montes, R. Rodil, J. B. Quintana, A. I. Gomes, V. J. P. Vilar: "Urban Wastewater Resources Recovery - Integration of Nanofiltration and Advanced Oxidation Processes" - Symposium on Environmental Engineering - 5th Doctoral Congress in Engineering (DCE23), 2023, Porto, Portugal