

Book of Abstracts

of the

Symposium on Environmental Engineering

Editors:

Ana Silva, Carla Santos, Filipe Francisco, Inês N. Rodrigues,
Inês M. Rodrigues, Juliana Sá, Orleane Brito,
Luiza Sena, Miguel Costa, Tânia Silva,
Sofia Sousa, Vítor Vilar

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LEADING THE CHANGE FOR A GREENER FUTURE

SYMPOSIUM ON ENVIRONMENTAL ENGINEERING



This volume contains the peer-reviewed and accepted abstracts presented at the Symposium on Environmental Engineering of the 6th Doctoral Congress in Engineering – DCE25, held at the Faculty of Engineering of the University of Porto (FEUP), between June 30th and 1st July, 2025.

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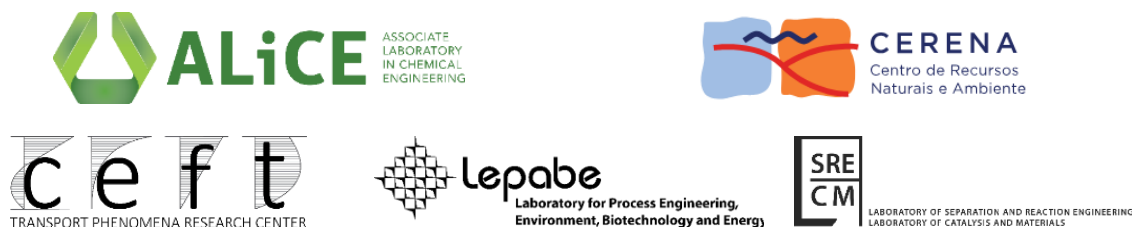
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WELCOME

Message from the Organizing Committee

We warmly welcome all participants to the Symposium on Environmental Engineering (SEE), held in the scope of the 6th Doctoral Congress in Engineering (DCE25), hosted at the Faculty of Engineering of the University of Porto (FEUP), Portugal, on the 30th June and 01st July 2025.

This Symposium is organized by PhD students of the Doctoral Program in Environmental Engineering (PDEA) at FEUP, with the support of the Associate Laboratory ALiCE (integrating the R&D Units LEPABE, LSRE-LCM and CEFT) and CERENA.



The Symposium covers a wide range of themes in the field of Environmental Engineering, aligned with the UN Sustainable Development Goals. It includes both oral and poster presentations, mainly covering the following topics:

- Water and Wastewater: New Directives, New Opportunities, New Challenges
- Waste Management: Towards New Approaches
- Clean Air and Energy: Becoming Accessible for All
- Sustainability and Innovation: Seeking a New Future

We are truly grateful to our invited speakers for accepting our invitation and sharing their expertise, thereby enhancing the quality and impact of the Symposium.

The Symposium received 81 submissions, reviewed with the support of the Scientific Committee, resulting in 17 oral and 64 poster presentations.

We would like to take this opportunity to express our sincere appreciation to all authors for their valuable contributions, as well as to the Symposium Organizing Committee, the Scientific Committee, Associate Laboratory ALiCE (comprising the R&D Units LEPABE, LSRE-LCM, and CEFT), CERENA, and all participating institutions for their invaluable support.

Porto, June 2025

The Symposium Organizing Committee

PC 47. Valorization of Biomass Waste into Sustainable Aviation Fuels: A Life Cycle Assessment Perspective

Rui A.F. Malheiro^{1,2}, Sebastian Schmitt³, Adrián M.T. Silva^{1,2}, M. Fernando R. Pereira^{1,2},
Idelfonso B.R. Nogueira⁴, Joana F.J.R. Pesqueira^{1,2}, Lucília S. Ribeiro^{1,2}

¹LSRE-LCM—Laboratory of Separation and Reaction Engineering - Laboratory of Catalysis and Materials, Faculty of Engineering, University of Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal

²ALiCE—Associate Laboratory in Chemical Engineering, Faculty of Engineering, University of Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal

³LTD—Laboratory of Engineering Thermodynamics, Department of Mechanical and Process Engineering, RPTU Kaiserslautern, Erwin-Schrödinger-Str. 44, 67663 Kaiserslautern, Germany

⁴Chemical Engineering Department, Norwegian University of Science and Technology, Gløshaugen, 7034 Trondheim, Norway

Presenting author email: up202007557@up.pt

Abstract

The aviation sector faces increasing pressure to transition from fossil-derived fuels to more sustainable alternatives to meet global climate goals [1]. Sustainable Aviation Fuels (SAFs) offer a promising alternative, but their environmental performance depends on the nature of the feedstock, conversion pathway, and process design. This study aims to evaluate the potential of biomass waste valorization for SAF production, focusing on catalytic conversion routes. A Life Cycle Assessment (LCA) was carried out using SimaPro, a software platform that quantifies environmental impacts across a product's full life cycle, following the ISO 14044 guideline [2]. The assessment was based on the process described in a paper titled “Pilot study on production of aviation fuel from catalytic conversion of corn stover”, which utilizes corn stover as a representative lignocellulosic biomass [3]. The environmental results will be compared with conventional fossil-derived jet fuels and commercial SAF production routes like Hydroprocessed Esters and Fatty Acids (HEFA) and Fischer–Tropsch (FT) synthesis. The conversion system is currently being modeled in Julia to validate mass flows and assess process performance. Moreover, this study aims to explore optimization strategies to reduce steam energy demand in the steam stripping unit, increase water recirculation to minimize freshwater usage, and replace homogeneous acid catalysts with heterogeneous ones to enhance catalyst recovery and system sustainability. These results will contribute to a deeper understanding of low-impact SAF production pathways and support future efforts to decarbonize the aviation sector through advanced biomass conversion technologies.

Acknowledgments

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