

DCE 23

5th DOCTORAL CONGRESS IN ENGINEERING

15 - 16 JUNE 2023
FEUP | PORTO - PORTUGAL



Symposium on Chemical and Biological Engineering

Chair: Alexandra Pinto

Time for oral presentation: 7 min + 3 min discussion

Event's location: B026

Begin	End	June 15th, Thursday
8:00	9:00	Welcoming (reception)
9:00	9:30	Opening Session (auditorium)
9:30	10:00	Industry Keynote lecture (auditorium)
10:00	11:00	Round table: 'Early Stage Research in Industry' (auditorium)
11:00	11:30	Coffee-break (coffee lounge)
11:30	12:30	Plenary Session: "Sustainable Engineering for an Intelligent World" (auditorium)
12:30	14:00	Lunch (coffee lounge) +
14:00	15:00	Poster Session + Workshops
15:00	16:30	Parallel Symposia (check your Symposium room)
16:30	17:00	Coffee-break (coffee lounge)
17:00	18:30	Parallel Symposia (check your Symposium room)

Begin	End	June 16th, Thursday
8:00	9:00	Welcoming (reception)
9:00	10:30	Parallel Symposia (check your Symposium room)
10:30	11:00	Coffee-break
11:00	13:00	Parallel Symposia (check your Symposium room)
13:00	14:30	Lunch (coffee lounge) +
14:30	15:30	Poster Session
15:30	16:00	Award Ceremony (auditorium)
16:00	16:30	Keynote Lecture 'Prof. Manuel Heitor' (auditorium)
16:30	17:00	Closing Session (auditorium)
17:00		Cocktail/Porto d'Honra

Session I (15th June, 15h00-16h30 and 17h00-18h30) | Innovative Materials, Reaction and Separation Processes

Moderated by Alexandra Pinto and Cláudia Silva

- José Ricardo Barbosa. Macrostructured MWCNTs catalysts prepared by direct ink writing for oxalic acid ozonation. #72
- Teresa I. A. Gouveia, Ana Gorito, Beatriz Cristóvão, Vanessa Pereira, João Crespo, Arminda Alves, Fernando Pereira, Ana Rita Lado Teixeira Ribeiro, Adrian M. T. Silva and Mónica Santos. Combination of nanofiltration and ozonation to remove antineoplastic drugs from wastewaters. #81
- Karoline K. Ferreira, Lucilia Ribeiro and Fernando Pereira. Optimization of Catalytic Deoxygenation Reaction of Palmitic Acid for Production of Aviation Fuel Components. #89
- Pedro M. Walgode, Rui P. V. Faria and Alírio E. Rodrigues. Dihydroxyacetone Separation from Glycerol Catalytic Oxidation Products in a Simulated Moving Bed Cascade: Proof-of-Concept. #130
- Thais Theomaris Grabowski, Marlei Veiga dos Santos and Ramiro José Espinheira Martins. The photo-Fenton process for the treatment of wastewater from olive oil extraction industry. #145
- Ana R. Querido. N-doped CNT-ZnO composite as supporting material of Cu-based catalysts for the Reverse Water-Gas Shift Reaction. #158
- André Torres-Pinto. Metal free g-C₃N₄ photoelectrocatalysts for degradation of pharmaceutical substances in the treatment of urban wastewater. #338
- Sara Caruncho-Pérez, María Ignacio-Meijoeiro, Xoel Montes-Paradela, Marta Pazos, M. Ángeles Sanromán and Elisa González-Romero. Nanostructures and MOFs as electrochemical transducers for the voltametric analysis of drugs in water. #348

----- Coffee-break -----

- Sandra M. Gomes, Daniela Albuquerque and Lúcia Santos. Value-added cereal-based products: incorporation of natural phenolic compounds in fresh pasta. #354
- Duarte J. Magalhães. Mono- and Bimetallic Carbon Nanotubes as Bifunctional Oxygen Electrocatalysts. #355

- Amala Joy, Joana Cancela, Isabel Barbosa, Maria Sampaio, Joaquim Faria, Ricardo J. Santos and Claudia G. Silva. Photocatalytic Ammonia Production using Immobilized GCN-T Catalysts. #358
- Ana M. Chávez. Graphitic carbon nitride immobilized onto ceramic foam for the degradation of sulfamethoxazole mediated by visible-light photocatalytic wet peroxide oxidation. #359
- Rita A. M. Barros, Raquel O. Cristóvão, Maria Sampaio, Claudia G. Silva and Joaquim Faria. Graphitic carbon nitride as a novel platform for Horseradish Peroxidase biocatalytic reactions with in situ H₂O₂ production. #362
- Catarina M. Oliveira and José C. M. Pires. Sustainability assessment of FAME production from vegetable oil: GREENSCOPE methodology. #365
- Aida M. Díez, Veronica Laíño-Rodríguez, María Bolaños-Vázquez, M. Ángeles Sanromán and Marta Pazos. Synthesis and modification of biochars for their usage as catalysts in water splitting reactions and adsorption coupled to Advanced Oxidation Processes. #367
- Silvia Escudero-Curiel. Hydrothermal carbonization for agro-industrial waste valorization: synthesis of Nitrogen-doped hydrochars as carbocatalysts for efficient removal of pharmaceuticals in water treatment. #371

Session II (16th June, 9h00-10h30) | Transport Phenomena

Moderated by Alexandre Ferreira and José Araújo

- João P. Vale. Controlling Supramolecular Chirality through Asymmetric Secondary Flows in Helical Microchannels. #14
- Pedro T. Pacheco, Manuel Alves, João Campos and Júlio Paiva. Numerical study of particle dynamics in high-efficiency gas-solid cyclone loaded with spherical steel shot. #66
- Paulo H. Marrocos, Luís Silva, Mateus Pituco, Isabel Fernandes, Ricardo J. Santos and Vítor Jorge Vilar. Towards an Optimization of the NETmix for Ozonation: Evaluation of the Effect of Channel Length on the Gas-Liquid Mass Transfer. #149
- André Fonseca Malaquias, João Miranda and João Campos. Utilization of Moisture Barriers with Enhanced Tortuosity and Porous Attachments to Mitigate Burns Introduced by Impermeability: A Numerical Study. #322
- Isabel Barbosa, João Costa, Yaidelin Manrique, Madalena Dias, Joaquim Faria, Ricardo J. Santos, Claudia G. Silva and Margarida Brito. ChannelCOMB, 3D-

Printed Device for Flow Distribution Uniformity in Mesostuctured Reactors.
#325

- Sofia R. S. P. Brandão, Ricardo J. Santos and Margarida Brito. Transition flow regimes in Baffled Reactors. #364
- Ana Margarida Silva, Paulo Costa, Cristina Delerue-Matos and Francisca Rodrigues. Sustainable application of *Actinidia arguta* leaves as active ingredient in topical formulation: Development, optimization and in vivo evaluation. #23
- Débora Nunes, Joana A. Loureiro and Maria Carmo Pereira. Precirol® ATO 5 and Miglyol® 612-based nanoparticles to target the brain and treat the Alzheimer's disease. #46

Session III (16th June, 11h00-13h00) | Biological Engineering and Biotechnology

Moderated by António Ferreira and Vânia Oliveira

- Diana Pinto, Andreia Almeida, Anallely López-Yerena, Bruno Sarmento, Rosa M. Lamuela-Raventós, Anna Vallverdú-Queralt, Cristina Delerue-Matos and Francisca Rodrigues. Valorization of a nutraceutical ingredient extracted from a chestnut by-product towards the implementation of Sustainable Development Goals. #55
- Filipa Teixeira, Ana Margarida Silva, Cristina Delerue-Matos, Berta M. A. N. Estevinho, Paulo Costa and Francisca Rodrigues. Spray drying microencapsulation of *Actinidia arguta* fruits and leaves extract. #67
- Ana Barbosa, Darla Goeres, Nuno Azevedo and Laura Cerqueira. PNA-FISH applications for *Legionella* detection and localization in biofilms. #327
- João Vindeirinho, Ricardo Oliveira, Eva Pinho, Nuno Azevedo, Raquel Guiomar, Ahmed Wahed and Carina Almeida. Development of recombinase-aided amplification combined with nucleic acid lateral flow read-out for the diagnostic of RNA viruses – the detection of SARS-CoV-2 as an example. #329
- **Invited speaker:** José Nogueira (alumni PDEQB, current Hydrogen Business Manager in Bondalti). *Green Hydrogen as energy transition vector: an Industrial perspective.* 11h45
- Fábio R.M. Carvalho, Luciana C. Gomes, Marta Lima, Rita Teixeira-Santos, Ana Azevedo, Mohsin Amin, Mette Burmølle, Jelmer Sjollema, Filipe Mergulhão and

- Kathryn Whitehead. Biomimetic Surfaces from Cabbage Leaves: A Novel Approach to Prevent Biofilm Formation on Food Environments. #343
- Marta Lima, Luciana C. Gomes, Rita Teixeira-Santos, Maria João Romeu, Jesus Valcarcel, José Vázquez, Miguel Cerqueira, Lorenzo Pastrana, Ana Bourbon, Ed.d. De Jong, Jelmer Sjollem and Filipe Mergulhão. Development of antifouling surfaces coated with chitosan from *Loligo opalescens* for marine applications. #369
 - Mariana A. Messias, Sara Ferreira, Loleny Tavares and Lúcia Santos. Incorporation of agro-industrial by-products extracts as an alternative to synthetic UV filters to develop a value-added sunscreen. #353
 - Ariana S. C. Gonçalves, Manuel Simões and Anabela Borges. Photoinactivation of clinical strains of *Staphylococcus aureus* using curcumin as photosensitizer agent. #372

Poster session (15th June, 13h00-15h00)

Moderated by António Ferreira and Daniela Falcão

- Mariana Sousa, Ana C. Afonso, Lília Soares Teixeira, Anabela Borges, Maria José Saavedra, Lúcia Chaves Simões and Manuel Simões: The antimicrobial and antibiofilm activity of novel phytochemicals against *Escherichia coli*. #21
- João P. Santos, Nuno Guimarães, Eva Pinho, Rita S. Santos and Nuno Azevedo: Delivery of Nucleic Acid Mimics into bacteria: effect of liposome composition in delivery efficiency. #24
- Manuel Peñas-Garzón, Almudena Gómez-Avilés, Javier Álvarez-Conde, Jorge Bedia, Eva M. García-Frutos and Carolina Belver: Metal-free sensitization of TiO₂ for photocatalytic removal of pharmaceuticals under solar irradiation. #38
- Diana Pinto, Manuela M. Moreira, Anna Vallverdú-Queralt, Cristina Delerue-Matos and Francisca Rodrigues: Bioactivity and phenolic composition of chestnut shells extract before and after *in-vitro* simulated gastrointestinal digestion. #56
- Filipa Teixeira, Ana Margarida Silva, Cristina Delerue-Matos and Francisca Rodrigues: Bioactive composition of goji berries extracted by Ultrasound-Assisted Extraction: Validation of a mathematical model. #68
- Yara B. Bastos, Antónia Gonçalves, Berta M.A.N. Estevinho and Fernando Rocha: Microparticles containing *Fragaria vesca* leaf extract produced with biopolymeric matrices: Binary and ternary blends of alginate, pectin and carrageenan. #83

- Beatriz T. Magalhães: Evaluating the diffusion of NAMs across the bacterial envelope. #86
- Filipe Almeida, Fernando Rocha and António Azevedo Ferreira: Continuous gas-liquid mass transfer in an oscillatory flow reactor provided with smooth periodic constrictions. #109
- Mariana B. Soares Felgueiras: Screening of supports and metal phases to obtain highly active catalysts for the CO₂ conversion in C₂₊ products. #111
- Gabriela P. Queirós, Clara Pereira and André M. Pereira: Investigation of different gel polymer electrolytes for flexible electrochromic supercapacitors. #119
- Ana Rita F. Pereira, Inês Gomes and Manuel Simões: Are parabens a hushed threat to drinking water microbiological quality? #121
- Rafaela M. Cabral: Ecological brick production from water treatment sludge in Brazil. #142
- Thais Theomaris Grabowski and Ramiro José Espinheira Martins: Treatment of effluent from the olive pomace oil extraction industry by coagulation. #146
- Ana C. Afonso, Inês Gomes, Maria José Saavedra, Lúcia Simões and Manuel Simões: *Delftia acidovorans* extracellular metabolites increase the biomass and metabolic activity of drinking water biofilms. #173
- Mariana Gomes: Delivering antisense NAMs into bacteria using dendritic lipids. #197
- Ricardo Oliveira, Eva Pinho, Nuno F. Azevedo and Carina Almeida: Selection of nucleic acid mimic (NAM) aptamers: from de novo SELEX to post-SELEX enhancement. #262
- Maria Teresa Oliveira, Isabel Barbosa, Margarida Brito, Cláudia G. Silva and Ricardo J. Santos: CFD design of photocatalytic mesostructured reactors for ammonia production. #268
- Sara Ferreira and Lúcia Santos: Phenolic rich extracts from by-products: promising compounds for the development of value-added foods. #296
- Racha Mansouri, Thais Theomaris Grabowski and Ramiro José Espinheira Martins: Efficient wastewater treatment in olive pomace oil extraction industry using Fenton method. #334
- Rita Marques: Active and stable Iridium-based catalyst for conducting oxygen evolution reaction in a proton exchange membrane electrolyser. #339
- Ingrid D. Soares, Isabel Maria Duque Martins, Júlia C. Kessler, Christianne Elisabete da Costa Rodrigues and Alírio Egídio Rodrigues: Identification of

aromatic compounds in cocoa bean shells compared to natural cocoa powder.
#340

- Ana Silva: Evaluating the impact of thermal disinfection on *Pseudomonas fluorescens* biofilm structures using a CDC biofilm reactor. #341
- Violina B. Barbosa, Laura Cerqueira, João Miranda and Nuno F. Azevedo: Microparticles separation in microchannels. #345
- Paula Esteiro Simón and Elisa González-Romero: Looking for the toxin. #350
- Ana Rita T. Fernandes, Ana Rita Lado Teixeira Ribeiro, Luís M. Madeira and Adrián M.T. Silva: Direct contact membrane distillation-promoted persulfate activation as an innovative approach in water desalination. #351
- Ana M. Chávez: Photocatalytic activity of phosphorescent strontium aluminate doped with Eu^{2+} and Dy^{3+} . #360
- Barbara Lomba Fernandez, Antía Fdez-Sanromán, Emilio Rosales, Marta Curras and M^a Ángeles Sanromán: Development of different CuFe-MOF/PMS systems for selective treatment of wastewater pollutants. #363
- Mafalda Pina: Reduction of critical raw materials in PEM water electrolysis catalysts for green hydrogen production. #366
- Patrícia Ramalho, Salomé Soares and Fernando Pereira: Carbon nanotube-supported bimetallic catalysts with high activity for the selective catalytic reduction of NO_x. #370
- Miguel M. Leitão, Manuel Simões and Anabela Borges: Effectiveness of selected aldehydes as inhibitors of the LasI/LasR quorum sensing pathway and enhancers of antibiotic activity against *Pseudomonas aeruginosa* biofilms. #373