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**PYChem**  
Portuguese Young Chemists Meeting

FARO

28-30 APRIL 2025




# BOOK OF ABSTRACTS

## 9<sup>TH</sup> PORTUGUESE YOUNG CHEMISTS MEETING

28-30 April 2025,  
University of Algarve



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**Authors** Carina Vieira, Daniela Malafaia, Diana Cunha, Joana Leal,  
João António  
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- OC28.** *Catarina Ribeiro*, Proton-Electron Dual Conductivity in a Tetrathiafulvalene-Phosphonate Metal-Organic Framework
- OC29.** *Francisca Carvalho*, Design, Synthesis, and Evaluation of Small Molecule Inhibitors Targeting SARS-COV-2
- OC30.** *João Felicidade*, Data-Driven Discovery of a New Fluorescent BASHY Dye for Bioimaging
- OC31.** *Tiago M. P. Santos*, Biomass-derived Cyclopentenones as Linkers for Therapeutic Peptide Cyclization
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## Flash communications

### April 28<sup>th</sup> (afternoon)

- FC1.** *Elisa M. Brás*, Empowering the Next Generation of Chemists: The Role of IYCN in Shaping a Sustainable Future
- FC2.** *Álvaro Carmo Delcán*, Influence of Ni-based Catalysts Architecture Deposited by Magnetron Sputtering for Alkaline Membrane Electrolyzers
- FC3.** *Melissa Giacomet Mezzalana*, Dry Purification of Ethanolic Biodiesel through Adsorption using Almond Shell based Materials
- FC4.** *Gabrielle Tokawa Morizaki*, Removal of Metformin from Aquatic Matrices using Cork-based Adsorbents
- FC5.** *João Borges*, Supramolecular Hydrogels Assembled by Quaternized Chitosan/Alginate Polyelectrolyte Complexation for Biomedical Applications
- FC6.** *A. S. Castro*, Cellulose Acetate and Ionic Liquids Composites for Colorimetric Detection of Iron in Water Matrixes
- FC7.** *Tiago Dias*, Synthesis and Spectroscopic Characterization of Luminescent Europium(III) Complexes Supported on Rice Husk Ash

## Poster communications

### Analytical Chemistry

- PC1.** Molecularly Imprinted Polymer Nanoparticles for BSA Detection: Characterization and Analytical Performance
- PC2.** Fluoroquinolones: Optimising Extraction and Chromatographic Methods – Preliminary Data

### FC3. Dry Purification of Ethanollic Biodiesel through Adsorption using Almond Shell based Materials

Melissa G. Mezzalira<sup>1,2,\*</sup>, Maria Carolina Sérgio Gomes<sup>2</sup>, Ana Queiroz<sup>1</sup>, António E. Ribeiro<sup>1</sup>, Paulo Brito<sup>1</sup>

<sup>1</sup>CIMO, LA SusTEC, Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal; <sup>2</sup>Universidade Tecnológica Federal do Paraná, Jardim Paraíso, 86812-460 Apucarana, Brasil

\*[melissagiacommet@gmail.com](mailto:melissagiacommet@gmail.com)

Petroleum-based fuels and non-renewable sources remain dominant in the global energy supply, meeting 80% of global energy demand in 2023. However, using these non-renewable fuels results in significant emissions of pollutants into the atmosphere, including greenhouse gases such as carbon dioxide (CO<sub>2</sub>) [1]. In this context, biodiesel is a potential alternative to meet global energy demand as a substitute for non-renewable fuels, as it is considered one of the best alternatives to diesel due to its comparable properties, not requiring major amendments in machines with combustion motors, biodegradability, and renewable advantages [2]. Biodiesel is usually produced through a transesterification reaction using different sources of triglycerides, primarily edible vegetable oils. However, waste cooking oil (WCO) is an excellent feedstock alternative, as it is a waste product generated in significant quantities by the food industry, often improperly discarded, causing environmental harm [3]. Biodiesel purification is another important step in the process, as contaminants such as glycerol can damage engines, requiring their removal before the fuel can be commercialized. Several purification methods can be applied, the most common being wet washing, which uses large amounts of water to solubilize glycerol and other impurities in biodiesel. However, more sustainable methods like dry washing involving adsorbent materials are currently under extensive study [4]. Hence, this study aims to produce and characterize activated carbon derived from almond shells, evaluating its use in purifying the ethanollic biodiesel produced from WCO. In this work, biodiesel was produced via an ethanollic route with a 1:7.5 oil/ethanol molar ratio and NaOH catalyst load of 0.5%(w/w). Furthermore, the activated carbon was chemically activated with phosphoric acid (H<sub>3</sub>PO<sub>4</sub>) and carbonized at 550°C for 1 hour, achieving a carbonization yield of 59.4%(w/w). The materials were characterized by the determination of the point of zero charge (pHPZC) and the quantification of functional groups present on the material's surface. Activation with H<sub>3</sub>PO<sub>4</sub> had an impact on the materials' characteristics, as evidenced by the decrease, from 6.48 to 4.96, in the pHPZC value compared to that of the raw material, given that the number of acid groups on the surface of the materials exhibits higher values after activation. The activated carbon materials will be tested for their capacity to remove glycerol from crude ethanollic biodiesel, aiming to meet the quality standard specified by EN14214, which sets the maximum biodiesel free glycerol content at 0.02%(w/w).

#### References

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- [2] Y. Devarajan, *et al.*, *Sustainable Chemistry and Pharmacy*, 30 (2022) 100840.
- [3] M.G. Gomes, *et al.*, *Fuel*, 155 (2015).
- [4] M.N. Kılıçarslan, M.E. Argun, *Journal of Water Process Engineering*, 54 (2023) 103989.

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