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**XXVI ENCONTRO GALEGO PORTUGUÉS DE QUÍMICA**  
**CONGRESO INTERNACIONAL**



Abajando a ciencia e a tecnoloxía á sociedade, en la salud, el ambiente e a alimentación



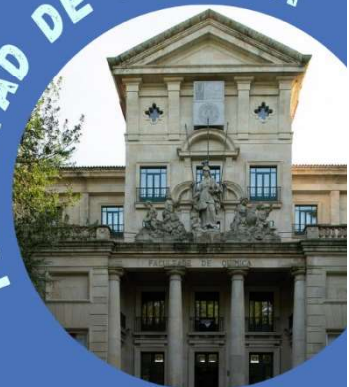
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## RELACIÓN DE COMUNICACIONES

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- EDU02 Tres tristes tigres comen mijo en un mijal.  
EDU03 Y nos dieron las diez y las once, las yodo, la una, las dos y las tres.

### Póster/Panel

- EDU04 Determinación de la dureza en las aguas. Ablandamiento de aguas por intercambio iónico.  
EDU05 Práctica virtual de Laboratorio de Química: Determinación del calor de combustión y de formación de la aspirina (ácido acetilsalicílico).  
EDU06 Caso Práctico: evaluación de la corrosión en armaduras de hormigón por medio de la medición del campo potencial.

## QUÍMICA INDUSTRIAL E INGENIERÍA QUÍMICA

### Oral

- IND01 Captura de CO<sub>2</sub> con carbones preparados a partir de serrín de pino (*Pinus radiata*)  
IND02 Study and modeling of the equilibrium and dynamics of post-combustion CO<sub>2</sub> adsorption using carbon-based adsorbents.  
IND03 Estudio físico-químico de sistemas de Triton X-102 + sales.  
IND04 Viscosidad dinámica de sistemas binarios n-octano +1-alcohol.  
IND05 Obtainment of different biosurfactant extracts from corn steep liquor depending on the extraction process.  
IND06 Biodiesel production from residual cooking oils and its purification by adsorption processes based on adsorbents of natural origin.  
IND07 Study of biodiesel production from waste cooking oil by ethyl transesterification and its purification using adsorption processes.  
IND08 Identification of gramicidin in biosurfactant extract by ESI-MS: a preliminary study.  
IND09 Antioxidant activity of biosurfactant extracts obtained from corn steep liquor.  
IND10 Optimization of the hydrothermal extraction of antioxidants from *Opuntia ficus-indica*.  
IND11 Valorization of liquid and solid extracts from *Undaria pinnatifida* using microwave assisted extraction.  
IND12 Characterization of the Mediterranean green algae *Caulerpa prolifera* and investigation of its antioxidant capacity using green extraction assisted by microwaves.  
IND13 Modeling and simulation of biomass pyrolysis processes.

### Póster/Panel

## Biodiesel production from residual cooking oils and its purification by adsorption processes based on adsorbents of natural origin

**Maria I. L. Garção<sup>1,2,\*</sup>, Maria Carolina Sérgio Gomes<sup>3</sup>, Ana Queiroz<sup>1,2</sup>, António E. Ribeiro<sup>1,2</sup>, Paulo Brito<sup>1,2</sup>**

<sup>1</sup>Centro de Investigação de Montanha (CIMO), Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal

<sup>2</sup>Laboratório para a Sustentabilidade e Tecnologia em Regiões de Montanha, Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal

<sup>3</sup>Universidade Tecnológica Federal do Paraná, Jardim Paraíso, 86812-460, Apucarana, Brasil  
*\*m.limagarcao@gmail.com*

Total global energy consumption has increased significantly in recent decades, and nowadays the main sources of world energy are oil, coal and natural gas. In addition to environmental concerns, the limited availability of fossil fuels has increased the interest in exploring alternative energy sources. In this quest, biofuel is a promising renewable energy source with low carbon emissions, also, it can be produced from a variety of resources, including waste cooking oil (WCO). Biodiesel is renewable, biodegradable, non-toxic, sulfur-free and free of aromatic carcinogens [1].

Biodiesel is produced by transesterification/esterification, a reaction that converts oil or free fatty acids into alkyl esters, also known as Fatty Acid Alkyl Esters (FAAE's). The properties of biodiesel depend on the raw materials used in its manufacture, and it should be similar to petroleum diesel to be used in engines without modification. All parameters are defined by standards, such as EN 14214-2008, which is the standard used in Europe [2]. To attend to all the requirements, the biodiesel must go through a purification process, which is important to remove impurities in the final product, such as excess alcohol, glycerin, etc. In this work, the chosen process for purifying the produced biodiesel is adsorption, the phenomenon in which solutes bind to solid surfaces. It is widely used in chemical and biochemical processes to recover or remove certain substances [3].

Several studies have been carried out on the purification of biodiesel by adsorption. Materials such as silicates, clays, polymers, among others, are widely used as adsorbents. Combined with the need to purify biodiesel and the proposal to reuse waste oil, cork residue is being investigated as a potential adsorbent because it is a porous material with a large surface area [4].

The first stage of the research was the optimization of biodiesel production. The effects of factors such as oil:alcohol molar ratio, catalyst load and reaction temperature on the transesterification of WCO samples with ethanol were investigated. Afterward, the study continues with the production of activated carbons from cork residue samples in order to investigate the removal efficiency of glycerol in different samples of crude ethyl biodiesel synthesized under the optimal conditions of oil alcohol ratio, catalyst loading and reaction temperature. Finally, the cleaned biodiesel is analyzed to verify if it meets the specifications of the EN 14214 standard. As part of the optimization of biodiesel production, preliminary studies have shown that the best FAAE's yield is achieved at 30°C, 1% w/w catalyst load and a 1:9 oil:alcohol molar ratio. Subsequently, a study covering the carbon materials synthesis and their respective characterization has been carried out.

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