2º Encontro Ibérico de **Fluidos Supercríticos**
Encuentro Ibérico de **Fluidos Supercríticos**

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Book of abstracts

28 Fevereiro - 2 Março
28 Febrero - 2 Marzo

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This book contains the abstracts presented at the Second Iberian Meeting on Supercritical Fluids (2º Encuentro Ibérico de Fluidos Supercríticos/2º Encontro Ibérico de Fluidos Supercríticos), held in Coimbra – Portugal, on 28 February-2 March 2022.

Second Iberian Meeting on Supercritical Fluids
(2º Encuentro Ibérico de Fluidos Supercríticos/
2º Encontro Ibérico de Fluidos Supercríticos)

Book of Abstracts

Second Iberian Meeting on Supercritical Fluids
28 February – 2 March 2022
Faculty of Sciences and Technology
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Conference location

Faculdade de Ciências e Tecnologia (Main Building) (Pólo II)
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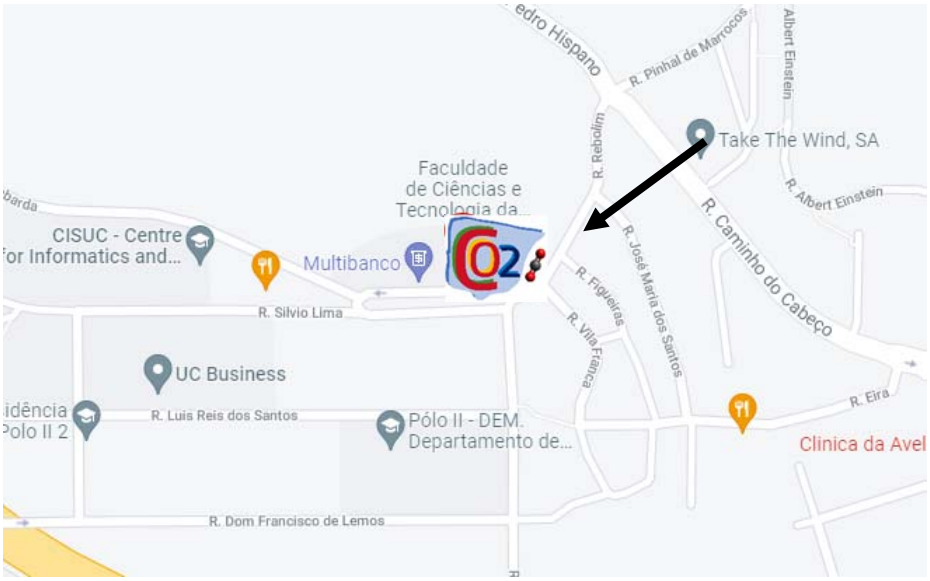
R. Sílvio Lima, Pólo II, 3030-790 Coimbra, Portugal
Google Maps: https://goo.gl/maps/MkEyzyvsuLGCL1WZ9



Supercritical CO_2 Extraction and Purification of Bioactive Compounds in Olive Leaf with Molecularly Imprinted Polymers

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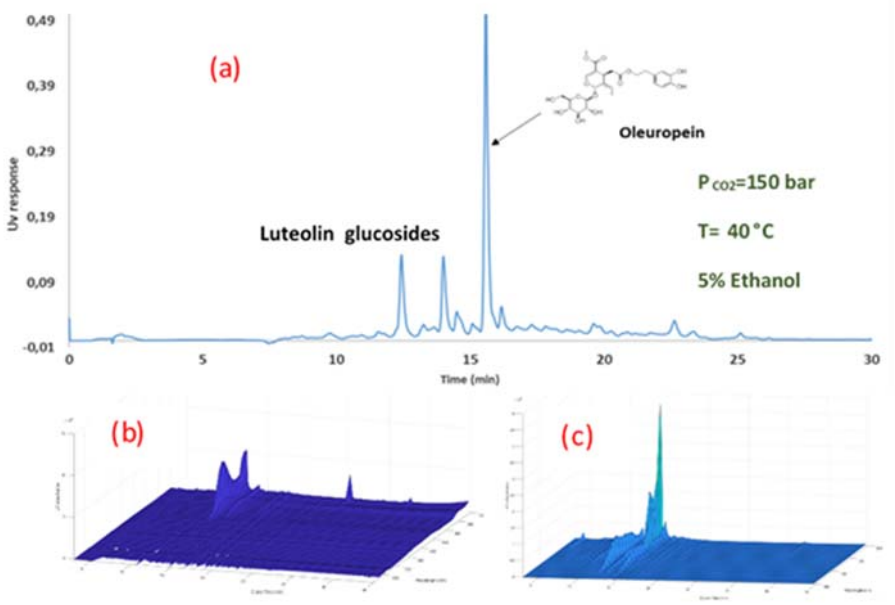
GRAPHICAL ABSTRACT



ABSTRACT

Around 4.5 million tons of leaves are generated each year as a by-product of the olive and olive-oil production. These olive leaves must be removed from the fields and olive-mills. Usually they are burned, or else used as fuels or for animal feed. However, olive leaf is extremely rich in bio-resources, being estimated that around 1 million tons of bioactive compounds, 1 million tons of cellulose and 1.5 million tons of lignin are currently underexploited [1]. In particular, the extraction and isolation of high-added value bioactive compounds in olive leaf (e.g. polyphenols, triterpenoids, essential oils, lipids, lignocellulose) is especially appealing due to their high-market potential in the food, feed, chemical, nutraceutical, cosmetic and pharmaceutical sectors [1].

This research combines the extraction of bioactive compounds in olive leaf using supercritical CO_2 with the subsequent processing of the extracts by sorption/desorption in

Molecularly Imprinted Polymers (MIPs), aiming at the isolation and purification of target compounds. Supercritical CO_2 extractions were performed in a range of operating conditions with temperature between 35 and 50 °C and pressure changing from 100 to 170 bar. Additionally, the presence of a co-solvent (e.g. ethanol, ethyl acetate), in a range of 0 to 10% (wt% with respect to CO_2), is also considered for assessment of their effect on the profile of the extracted compounds. HPLC-DAD and LC-MS are used for the identification/quantification of the bioactive compounds extracted with the different supercritical operation conditions, as illustrated in the graphical abstract for a run with P_{CO2}=150 bar, T=40 °C, 5% ethanol. In this extract, oleuropein and luteolin/luteolin-glucosides are the majority compounds but oleoside, verbascoside and oleanolic acid, among others, were also identified in the different extracts produced.

Due to their improved specificity, the efficient isolation/purification of bioactive compounds in plant extracts, namely in olive leaf extracts, is being nowadays considered with MIP adsorbents [2-4]. In this research we are designing and synthesizing MIPs to target compounds in olive leaf extracts considering the combination of different functional monomers (e.g. 4-vinylpyridine, methacrylic acid, acrylamide, styrene, etc) with capacity for H-bonding donor/acceptor interactions and π-π stacking with the template molecules (e.g. oleuropein, luteolin, oleanolic acid). Potential oxoanion interactions with urea groups are also being considered using a functional monomer synthesized from the condensation of 4-vinylaniline with 3,5-bis(trifluoromethyl)phenyl isocyanate. Morphology of the MIP particles is being tailored considering precipitation and suspension polymerization [3,4]. Furthermore, synthetic core-synthetic shell and cellulose core-synthetic shell [5] MIP particles are also being developed to enhance surface imprinting. Atom Transfer Radical Polymerization is being used for the generation of the hybrid cellulose-synthetic MIPs [5]. The different kinds of MIPs particles are assessed in sorption/desorption processes involving standard molecules and also real olive leaf extracts, namely with high pressure continuous processes. The results obtained show the feasibility of the proposed approach for the valorization of the olive leaf by-products as illustrated in graphical abstract b/c with the separation of luteolin and oleuropein enriched fractions.

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