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

C. Gomes[a], A. Almeida[a], R.C.S. Dias[a], C. Martins[a,b], M.R.P.F.N. Costa[b]

[a] CIMO/LSRE-Instituto Politécnico de Bragança, Quinta de Santa Apolónia, 5300, Bragança, Portugal

[b] LSRE-Faculdade de Engenharia da Universidade do Porto, Rua Roberto Frias s/n, 4200-465, Porto, Portugal

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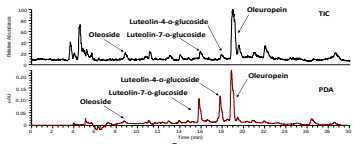
• Overview of this research

4.5 million tons of olive leaves generated each year

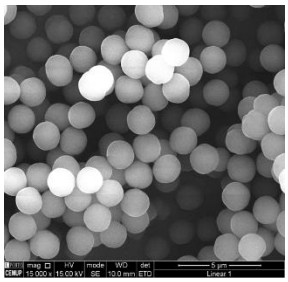
Extraction
Bioactive compounds

•Supercritical CO_2



Fractionation
Concentration

Mixture of secoiridoids, triterpenic acids, flavonoids, lignans…



Molecularly Imprinted Polymers (MIPs)

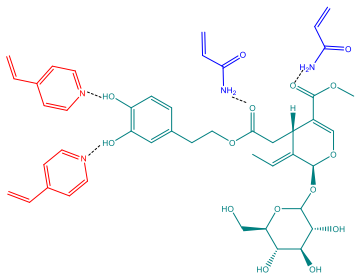
• Molecular Recognition
• Improved downstream processing

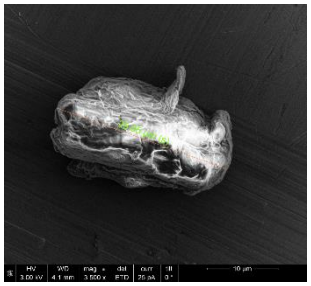
• Challenges

• Selection of supercritical CO_2 extraction conditions for changing the extract composition

Pressure (100 - 170 bar)
Temperature (35 - 50 °C)
Co/trap-solvent (0-10%)
ethanol, ethyl acetate, n-hexane, water

• Defining polymerization conditions to obtain tailored MIPs with improved molecular recognition features





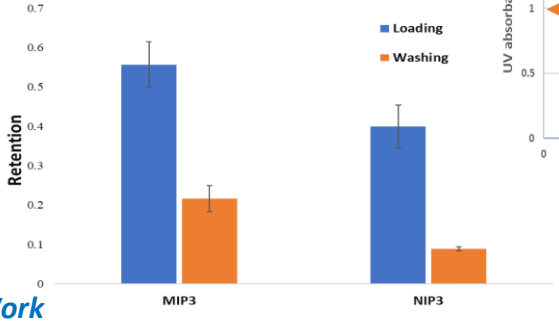
Looking for favorable Functional Monomer(s)-Template interactions
Surface imprinting for enhanced mass transfer

Hybrid MIPs (e.g. cellulose/synthetic, cork/synthetic by ATRP)

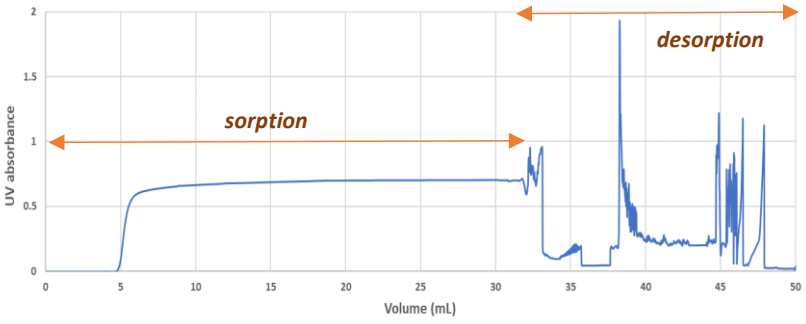
• Achievements

• An important effect of the co-solvent on extract composition was observed.
ethanol/ethyl acetate → triterpenic acids/secoiridoids

• Molecular Imprinting was achieved with particular conditions using as template molecules:
• Oleuropein
• Oleanolic Acid



• Purification through sorption/desorption in packed columns with MIPs



Processing of a supercritical CO_2 extract with ethanol as co-solvent

• On-Going Work

• Improving of supercritical CO_2 extraction efficiency

• Extension of MIP and sorption/desorption purification processes for other minority compounds in olive leaf (ligstroside, verbascoside, maslinic and ursolic acids, e.g.)

• References

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