



PhD program in  
Pharmaceutical  
Sciences

- Advanced courses -

Faculdade de Farmácia  
Universidade de Coimbra

## ADVANCED COURSE

### “Isolation and analysis of natural products”

5-8<sup>th</sup> July, 2022

#### Coordination

Carlos Cavaleiro: Professor Carlos Cavaleiro

Faculty of Pharmacy, University of Coimbra

[cavaleir@ff.uc.pt](mailto:cavaleir@ff.uc.pt)

#### OBJECTIVES AND SIGNIFICANCE

Nature has been, throughout time, the leading provider of substances and compounds for health and welfare, starting-material for drug manufacture, inspiration for new drugs and medicine advances. Far from being a mere reminiscing of the history, natural product research is currently a chief contributor for drug discovery, side-by-side with drug design, organic synthesis and biotechnology research. In the last three decades natural products research unveiled the new chemical entities that are in the origin of one third of the novel medicines that were registered worldwide.

Following the 2021 edition “Natural Product Research in Drug Discovery” dedicated to the potential of organisms and biomaterials as a source of biologically active compounds, this 2022 edition will be focused on the analysis of natural products, highlighting methodologies and strategies used for analysis of complex herbal preparations, for isolation, purification and characterization of plant metabolites.

The course will comprise four afternoon *online* sessions with lectures and seminars (total of 10 h) addressed by Professors from the University of Coimbra, the University of Paris, Cité and the University Degli Studi Di Cagliari.

Due to the multidisciplinary character of the research on natural products this is an opportunity to cross and to share knowledge on different topics of science, phytochemistry, phytochemical analysis, analytical chemistry, separation methods, spectroscopy, etc.. After each lecture or seminar a short time for discussion will be opened. Students are encouraged to participate interactively during classes and in the after-lecture discussions.

A certificate of attendance (with classification rate) will be delivered to students that have attended to all sessions and have submitted a final report on one of the topics exposed.

**Please register by sending an e-mail to [cavaleir@ff.uc.pt](mailto:cavaleir@ff.uc.pt)**



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## **PROGRAM**

WEST – Western European Summer Time (Lisbon time)

### **Tuesday, 5<sup>th</sup> July**

14:00 -14:30h

#### **Welcome session**

*Professor Carlos Cavaleiro*

Faculty of Pharmacy, University of Coimbra, Portugal

14.30 – 15:30

#### **Authenticity of plant material: macroscopic and microscopic analysis**

*Professor Lígia Salgueiro*

Faculty of Pharmacy, University of Coimbra, Portugal

15:30 – 17:30h

#### **Supercritical Fluids and their Applications.**

*Professor Silvia Porcedda*

Università degli Studi di Cagliari, Italy

### **Wednesday, 6<sup>th</sup> July**

14:30 – 16:30h

#### **MS techniques for Identification of phenolic compounds**

*Professor Artur Figueirinha*

Faculty of Pharmacy, University of Coimbra, Portugal

16:30h – 18:00h

#### **Sampling and analysis of volatile organic compounds**

*Professor Carlos Cavaleiro*

Faculty of Pharmacy, University of Coimbra, Portugal

### **Thursday, 7<sup>th</sup> July**

14:30 – 15:30h

#### **Quantification by NMR**

*Professor Julia Morais, Université Paris Cité, France*

16.30 - 17.30h

#### **(TBC)**

Marina Kritsanida

Faculty of Pharmacy, University Paris Cité, France

### **Friday, 8<sup>th</sup> July**

14:30 - 15.30h

#### **(TBC)**

Raimundo Gonçalves de Oliveira Junior

Faculty of Pharmacy, University Paris Cité, France

15:30 - 17.00h

#### **Isolation of natural products by Centrifugal Partition Chromatography**

*Professor Raphael Grougnet*

Faculty of Pharmacy, University, Paris Cité, France

17.00 - 17.30h

#### **Challenges for future.**

#### **Hints for the final report.**

#### **Farewell**



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### Professor SILVIA PORCEDDA



Associate Professor of Physical Chemistry (SSD CHIM/02)  
Department of Chemical and Geological Sciences (DSCG) University of Cagliari –  
Cittadella  
Universitaria di Monserrato, Building D, Monserrato (CA)  
[porcedda@unica.it](mailto:porcedda@unica.it)

[https://www.unica.it/unica/it/ateneo\\_s07\\_ss01.page?contentId=SHD307120000-0002-1441-3979AAE-7301-20197004106171](https://www.unica.it/unica/it/ateneo_s07_ss01.page?contentId=SHD307120000-0002-1441-3979AAE-7301-20197004106171)

Education and position: Graduated in Chemistry, University of Cagliari (1990)  
Main fields of interest: Thermodynamics of Mixtures; Applications of Supercritical Fluids as extractant medium.

**Scientific activity:** Her research activity mainly concerns thermodynamics of binary and ternary liquid mixtures containing ionic liquids in water and organic solvents. The experimental work has mainly concerned volumetric and calorimetric determinations. The data correlation has been faced using correlation function and group contributions models. Such techniques are applied also to the study of mixtures of ionic liquids in water and other typical solvents. An other line of research is aimed to isolate and characterize essential oils and other complex extracts, obtained from natural matrixes, using different extractive and analytical techniques. In particular, the application of supercritical carbon as extracting medium is studied, but also the feasibility of the process of inclusion of small molecules in oligo-saccharides.

**Teaching activities:** Physical Chemistry in the Pharmaceutical Chemistry and Technology degree course and Laboratory of Physical Chemistry in the Chemistry degree course.

**Professional activities:** Vice Coordinator (from 2017 to present) and member of CAV, the Self-assessment commission (2012 to present), of the degree courses in Chemistry and Chemical Technologies of UNICA.

**Publication record** (as of 28 June 2022): 3 book chapters, 144 peer-reviewed papers, citations 2559, h-index: 29

### Professor RAPHAËL GROUGNET PharmD, MSc, PhD



**Associate Professor** of the Faculty of Pharmacy, University of Paris (priscitê), teaching Pharmacognosy and Chemical Ecology.

**Senior Researcher** of UMR CNRS 8038

**Research activity**

- Natural products chemistry/phytochemistry, Structural determination, Nuclear Magnetic Resonance.
- Fractionation and isolation by methods with low environmental impact, Centrifugal Partition Chromatography, Resin adsorption process.
- Development of libraries of natural and semi-synthetic compounds.

Author of more than 50 publications (international peer-reviewed journals), 1 book chapter.