

## CURRICULUM VITAE ABREVIADO (CVA)

**IMPORTANT** – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.

### Part A. PERSONAL INFORMATION

First name	CLARA MARÍA		
Family name	PEREYRA LÓPEZ		
e-mail		URL Web: <a href="https://d151.uca.es/clarapereyralopez/">https://d151.uca.es/clarapereyralopez/</a>	
Open Researcher and Contributor ID (ORCID) (*)		0000-0003-1949-2773	

(\*) Mandatory

#### A.1. Current position

Position	UNIVERSITY PROFESSOR		
Initial date	01/04/2016		
Institution	UNIVERSITY OF CÁDIZ (UCA)		
Department/Center	CHEMICAL ENGINEERING AND FOOD TECHNOLOGY	FACULTY OF SCIENCE	
Country	SPAIN	Teleph. number	605121540
Key words	Supercritical Impregnation, Biodegradable Polymers, Scaffolds, SAS, RESS, Nanoparticles, sc-CO <sub>2</sub>		

#### A.2. Previous positions (research activity interruptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
1996/1998	ASSOCIATE PROFESSOR/UCA/SPAIN
1998/2001	ASSOCIATE PROFESSOR RD/UCA/SPAIN
2001/20016	FULL PROFESSOR/ UCA/SPAIN

#### A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Licensed in Chemistry	University of Cádiz	1991
Licensed with degree	University of Cádiz	1992
PhD Chemical Engineering	University of Cádiz	1996

### Part B. CV SUMMARY (max. 5000 characters, including spaces)

Graduated in Chemistry at the University of Cadiz (1991), I started my research activity in the field of Phase Equilibrium Thermodynamics, with the theoretical-experimental study of the saline effect in the distillation of aqueous mixtures, subject with which I defend my degree thesis (1992). Later, and thanks to the concession of a European project, I reorient my research work to the phase equilibrium with supercritical fluids, field in which I carry out the Doctoral Thesis (1996). With the award of the project PPQ2003-04245 and later CTQ2007-67622/PPQ, led by Prof. Dr. Martínez de la Ossa, I redirect my research in a more applied topic, the precipitation of nanoparticles (NPs). This new stage begins with the study of the precipitation of nanoparticles of pure compounds soluble in scCO<sub>2</sub> (SAS technique) and, later, not soluble in scCO<sub>2</sub> (RESS technique), implementing the research with the encapsulation of these compounds with biocompatible polymers thanks to the award of project CTQ2010-19368, with which I begin to lead and manage the research line.

After controlling the processes of precipitation and encapsulation of pure compounds, we went a step further and with the award of the project CTQ2013-47058-R we started to work on

supercritical impregnation (SSI), on the deposition of NPs and nanocapsules in porous solid matrices. This project was also a milestone, since it would initiate the development of the current objective of the research line: the SSI of porous matrices with bioactive compounds from natural extracts for biomedical applications.

Thus, with the following project CTQ2017-86661-R we started to research the obtaining of NPs from extracts of natural matrices (SAE technique), as well as their impregnation in porous matrices. The studies carried out allowed the defense of 3 doctoral theses, one on the supercritical precipitation of olive leaf extracts, in co-supervision with the University of Barhian (India), another on the precipitation and supercritical encapsulation of mango leaf extracts (doctoral candidate from the Universidad Particular Técnica de Loja, Ecuador) and the third on the impregnation of mango leaf extracts in different porous matrices, with international mention and, like the previous one, with the highest qualification. The development of this project involved the publication of 11 articles.

The work with polymers for encapsulation and with porous matrices for impregnation was the idea for the next project (PID2020-116229RB-I0): we create our porous matrices that meet the requirements for application in biomedicine and impregnate them with pharmacologically active substances. We are developing, by foaming, scaffolds of combined polymers, impregnating them with natural extracts from agricultural waste with bioactive properties and determining their viability in "in vitro" studies for a tissue regeneration.

The development of these projects has allowed me to establish collaborations with groups from other universities/international centers, such as the Institute of Experimental Biology and Technology (Lisbon), the Aix Marseille University (France), the Technische Hochschule Nürnberg Georg Simon Ohm (Germany), the University of Aveiro (Portugal), the Particular Technical University of Loja (Ecuador), the University of Barhian or the University of Campinas (Brazil).

Throughout my scientific career, I have participated in 28 research projects in competitive calls for proposals, 4 of them European and in 10 of them as PR: 3 AEI projects, 5 national, 2 regional and 3 scientific-technological infrastructure. These projects in which I have been the principal investigator have involved a total funding of 1.310.591,87 €. All this has allowed me to have more than 60 articles in indexed journals and to obtain five six-year periods of research. This has also allowed me to be mentioned in the document published by the CSIC on the ranking of the 5,000 most outstanding Spanish women scientists.

Other notable activities related to research activity have been my collaborations as an evaluator for the ANEP for Juan de la Cierva Grants, State Aid for the Postdoctoral Training Programme and the National R+D+I Plan. In addition, I have also participated in various activities for the dissemination of science to the public. As an example, the European projects, in many talks in secondary schools, sessions of the Science Week and the UCC+I activities as "Coffee with Science", "Women in science" or "Once upon a time there was a little girl who dreamed of becoming a scientist", as well as on YouTube.

In terms of management, I would like to highlight the direction of the Department of Chemical Engineering and Food Technology, the coordination of the Inter-University Master's in Chemical Engineering and the direction of the Secretariat for the Promotion of Research, of the Vice-Rector's Office for Research at the UCA.

## Part C. RELEVANT MERITS (sorted by typology)

### C.1. Publications (see instructions)

1. Ignacio García-Casas, Diego Valor, Desireé M. de los Santos, **Clara Pereyra**, Antonio Montes. Processing antimicrobial CeO<sub>2</sub>-TiO<sub>2</sub> nanocomposite using supercritical carbon dioxide, JCO2 80 (2024) 102667. <https://doi.org/10.1016/j.jcou.2024.102667>
2. D. Valor, I. García-Casas, A. Montes, E. Danese, **C. Pereyra**, E. Martínez de la Ossa. Supercritical Impregnation of Mangifera indica Leaves Extracts into Porous Conductive PLGA-PEDOT Scaffolds, Polymers 16 (2024) 133. <https://doi.org/10.3390/polym16010133>
3. A. Montes, D. Valor, Y. Penabad, M. Domínguez, C. Pereyra, E. Martínez de la Ossa. Formation of PLGA-PEDOT:PSS conductive scaffolds by supercritical foaming, Materials 16 (2023) 2441. <https://doi.org/10.3390/ma16062441>
4. García-Casas, A. Montes, D. M. de los Santos, D. Valor, **C. Pereyra**, E. Martínez de la Ossa. Generation of high-porosity cerium oxide nanoparticles and their functionalization with caryophyllene oxide using supercritical carbon dioxide, The Journal of Supercritical Fluids 196 (2023) 105901. <https://doi.org/10.1016/j.supflu.2023.105901>
5. A. Montes, D. Valor, L. Delgado, **C. Pereyra** and E. Martínez de la Ossa. An Attempt to Optimize Supercritical CO<sub>2</sub> Polyaniline-Polycaprolactone Foaming Processes to Produce Tissue Engineering Scaffolds. Polymers 14 (2022), 488. <https://doi.org/10.3390/polym14030488>
6. D. Valor, A. Montes, A. Cózar, **C. Pereyra** and E. Martínez de la Ossa. Development of Porous Polyvinyl Acetate/Polypyrrole/Gallic Acid Scaffolds Using Supercritical CO<sub>2</sub> as Tissue Regenerative Agents, Polymers 14 (2022) 672. <https://doi.org/10.3390/polym14040672>
7. D. Valor, A. Montes, M. Monteiro, I. García-Casas, **C. Pereyra**, E. Martínez de la Ossa. Determining the Optimal Conditions for the Production by Supercritical CO<sub>2</sub> of Biodegradable PLGA Foams for the Controlled Release of Rutin as a Medical Treatment. Polymers 13 (2021) 1645. <https://doi.org/10.3390/polym13101645>
8. I. Casas, C. Crampon, A. Montes, **C. Pereyra**, E. Martínez de la Ossa, E. Badens. Supercritical CO<sub>2</sub> impregnation of silica microparticles with quercetin, The Journal of Supercritical Fluids 143 (2019) 157-161. <https://doi.org/10.1016/j.supflu.2018.07.019>
9. I. Casas, A. Montes, D. Valor, **C. Pereyra**, E. Martínez de la Ossa. Impregnation of mesoporous silica with mangiferin using supercritical CO<sub>2</sub>, The Journal of Supercritical Fluids 140 (2018) 129-136. <https://doi.org/10.1016/j.supflu.2018.06.013>
10. A. Montes, A. Litwinowicz, U. Gradl, M. D. Gordillo, **C. Pereyra**, E.J. Martínez de la Ossa. Exploring High Operating Conditions in the Ibuprofen Precipitation by RESS Process. Ind. Eng. Chem. Res. 53 (2014) 474-480. <https://pubs.acs.org/doi/10.1021/ie402408j>

### C.2. Congress, indicating the modality of their participation (invited conference, oral presentation, poster)

1. Valor, D.; Montes, A.; **Pereyra, C.**; Martínez de la Ossa, E. J. Development of PLGA-PEDOT mixed polymeric scaffolds and their impregnation with natural extracts using supercritical CO<sub>2</sub>, 16th International Conference on Chemical and Process Engineering, Naples, Italia, 21-24 mayo 2023. Poster
2. I. Garcia-Casas, D. Valor, A. Montes, **C. Pereyra** and E.J. Martínez de la Ossa, Impregnation of bimetallic Ce-Ti particles on a polymeric PCL scaffold using supercritical CO<sub>2</sub>, 19th European Meeting on Supercritical Fluids, Budapest, Hungary, 21-24 mayo 2023. Poster
3. I. Garcia-Casas, D. Valor López, A. Montes, M. Renedo, **Clara Pereyra**, E.J. Martínez de la Ossa, Formation of novel composites titanium-cerium nanoparticles by supercritical antisolvent Process, Second Iberian Meeting on Supercritical Fluids, Coimbra (Portugal), 28/02 al 02/03/2022. Poster
4. I. Garcia-Casas, A. Montes, D. Valor, **C. Pereyra** and E.J. Martínez de la Ossa. Precipitation of Cerium Oxide nanoparticles by SAS process, ICheaP15 - the 15th International Conference on chemical and process engineering, Milan (Italia), 23-26 mayo 2021. Poster
5. L. Delgado, A. Montes, D. Valor, **C. Pereyra** and E.J. Martínez de la Ossa Development of PCL/PANI Scaffolds by Supercritical CO<sub>2</sub> for Its Application in Biomedicine, 18th European Meeting on Supercritical Fluids (EMSF), 04- 06 mayo 2021. Oral Presentation

**C.3. Research projects**, indicating your personal contribution. In the case of young researchers, indicate lines of research for which they have been responsible.

1. Technological and economic potential of the active packaging obtained by supercritical techniques for the preservation of Mediterranean fresh food (Im-Pack). Coordinator: C. Mantell. UCA. PRIMA European project. 2023-2026. Type of participation: Research Team. Amount: 1.5 M€
2. Innovation in the generation of active packaging through high pressure techniques using natural extracts. new materials, scaling and application in food (ProyExcel\_00920). PR: **C. Pereyra** /C. Mantell. UCA. Counseling of University, Research and Innovation (JA). 02/12/2022 - 31/12/2025. Amount: 143.686,01 €
3. Development of the Circular Economy Concept in the Olive Sector: Valorisation of Pruning Residues through the Use of Supercritical Technology (TED2021-131822B-I00). PR: **C. Pereyra**/L Casas. UCA. Ministry of Economy and Competitiveness. 19/12/2022 - 30/11/2024. Amount: 97.405 €
4. Functional polymeric devices using high-pressure processes for biomedical applications (PID2020-116229RB-I00). PR: **C. Pereyra**. UCA. Ministry of Economy and Competitiveness. 01/09/2021- 31/08/2024. Amount: 134.500 €
5. Impregnation of extracts and functionalization of antioxidant nanoparticles obtained from mango leaves by high-pressure processes and their application in biomedicine (CTQ2017-86661-R). PR: **C. Pereyra**. UCA. Ministry of Economy and Competitiveness. 01/01/2018 - 31/12/2020. Amount: 181.500 €
6. Impregnation of silica particles with nanocapsules of natural antioxidants using supercritical technology (CTQ2013-47058-R). Ministry of Economy and Competitiveness. PR: **C. Pereyra**. UCA. 01/01/2014 - 31/08/2017. Amount: 208120 €
7. Co-precipitation of non-steroidal anti-inflammatory drugs and polymers with supercritical carbon dioxide using the technique RESS (CTQ2010-19368). PR: **C. Pereyra**. UCA. Ministry of Science and Innovation. 01/01/2011-31/12/2013. Amount: 142.780 €
8. Encapsulation of micro- and nanoparticles of beta-lactam antibiotics in biocompatible polymers by SAS technique using supercritical carbon dioxide (CTQ2007-67622/PPQ). PR: E. Martinez de la Ossa. UCA. Ministry of Science and Innovation. 01/12/2007-30/11/2010. Type of participation: Research Team. Amount: 108.900 €
9. Generation of microparticles by the ASES technique using supercritical carbon dioxide. (PPQ2003-04245). PR: E. Martinez de la Ossa. UCA. Ministerio de Educación y Ciencia. 01/12/2003 – 30/11/2006. Type of participation: Research Team. Amount: 101.200 €

**C.4. Contracts, technological or transfer merits.**

- Contract OT2020/054. Researcher participant. FINANCIERA MADERERA SA (A15005499), “Study of impregnation of wood specimens (radiata pine and eucalyptus nitens) using supercritical CO<sub>2</sub> as a vehicle”. 23/06/2020 – 31/12/2020.
- Patent “Process for obtaining microparticles of ethanolic extract of habanero chili peppers (Capsicum chinense)”. Number: MX/A/2018/016293. Date: 13/12/2018