

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	Gemma		
Family name	Vicente Crespo		
Gender (*)	Female	Birth date	
Social Security, Passport, ID number			
e-mail		URL Web:	
Open Researcher and Contributor ID (ORCID)	0000-0003-0652-0528		

A.1. Current position

Position	Catedrática de Universidad Full Professor		
Initial date	February 2022		
Institution	Rey Juan Carlos University (URJC)		
Department/Center	Chemical, Energy, and Mechanical Technology	Higher School of Experimental Sciences and Technology	
Country		Teleph. number	
Key words	Microalgae, biorefinery, biofuels, bioproducts, circular economy		

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

Period	Position/Institution/Country/Interruption cause
2009 - 2022	Associated Professor. Rey Juan Carlos University. Spain
2006 - 2009	Acting Associate Professor. Rey Juan Carlos University. Spain.
2003 - 2006	Hired Professor (Prof. Asociada Tipo III). Rey Juan Carlos University. Spain
2001 - 2003	Hired Professor (Prof. Asociada Tipo II). Rey Juan Carlos University. Spain
2000 - 2001	Hired Professor. ICAI. Universidad Pontificia de Comillas. Spain
1997 - 2000	Predoctoral Research (FPI). Complutense University of Madrid. Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD in Chemistry	Complutense University of Madrid, Spain	2001
BSc in Chemistry	Complutense University of Madrid, Spain	1995

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

I am a professor of Chemical Engineering at Rey Juan Carlos University of Madrid (2022-present) and the Assistant Director of Research, Infrastructure, and Financial Issues at the School of Technology and Experimental Sciences at the same university (2020-present).

My professional journey, dedicated entirely to teaching and research, commenced in 1995 in the Chemical Engineering Department at Complutense University of Madrid (1995-2000) and later in the Materials and Chemistry Department at Comillas Pontifical University of Madrid (2000-2001). I joined the Chemical Engineering area of Rey Juan Carlos University in 2001. Additionally, I completed three research internships, spending three months at Aston University in Birmingham, United Kingdom in 1997, and three months at the Crops Research Centre of Teagasc in Carlow, Ireland in 1998, followed by 1.5 months in 1999.

My primary research focus is on Biofuel production and biorefinery processes. I initiated work at UCM (1995-2001) on producing first- and second-generation biodiesel from various vegetable and waste cooking oils. During my predoctoral stays (1998-1999) at the Crops Research Centre in Ireland, supervised by Dr. Andreas Fröhlich, I worked on biodiesel production from low-grade waste tallow obtained by the regulation to control the spread of bovine spongiform encephalopathy (BSE). This research resulted in 10 articles in JCR-indexed journals and 1 book chapter. Subsequently, a 5000-tonnes/year biodiesel production plant was established using waste cooking oil.

Continuing this line at URJC (2006-present), I focused on: (1) producing biodiesel additives from glycerine obtained as a by-product in the biodiesel production process with 6 publications in JCR journals, and (2) developing integrated biofuel production processes (biodiesel, biogas,

bio-oil) from microorganisms (fungi and microalgae) within the biorefinery concept. This research currently emphasizes the comprehensive use of biomass, coupling biofuel production with the development of green extraction processes for high-value bioproducts of industrial interest, while also addressing nutrient removal and the treatment of emerging contaminants using microalgae, all in line with circular economy principles. My research also encompasses process simulation, life cycle analysis, and economic analysis of the processes investigated. 23 works in JCR journals and 1 book chapter have been published, and 2 patents have been filed (one of which is still under review). During this period, significant collaboration has been maintained with companies Alga Energy and Microalgae Solutions through two Industrial Doctorate Projects of the Community of Madrid.

In the last year, building on our experience with microalgae liquefaction process (HTL), we have started working on the HTL process for wastewater sludge.

Additionally, I have worked on two research lines:

Chemical recycling of plastic waste: I initiated this research at Rey Juan Carlos University (2001-2010), studying the production of fuels from waste plastics (PP and PEAD) using solvents to enhance mass and heat transfer during the process. I have 4 publications in JCR journals related to this research line.

Design of heterogeneous catalysts: I worked on the synthesis of hierarchical zeolites and hybrid zeolitic–mesoporous materials for epoxide rearrangement reactions and Friedel–Crafts acylation from 2009 to 2014 (2 JCR publications).

Funding for the described research has come from competitive public calls (National, Regional, University) and contracts with industrial companies and private foundations.

My contributions to the training of young researchers are significant. I have supervised 5 doctoral theses, 4 of them in microalgae. Additionally, I have contributed to the research capacity development of another 4 researchers through various contracts from the Community of Madrid (predoctoral and postdoctoral contracts, INVESTIGO). This year, a research assistant will also begin a two-year contract under my supervision.

Part C. RELEVANT MERITS (sorted by typology)

C.1. Publications (Last five years)

- García N, Rodríguez R, Vicente G, Espada JJ, Bautista LF (2025) Comprehensive study on endocrine disruptor removal from wastewater using different microalgae species. *Applied Sciences*, 15(1):132.
- Águila-Carricondo P, Roche Cadavid JP, García-García R, Galán PL, Bautista LF, Vicente G (2024) Can mild alkaline pretreatment simultaneously enhance the antioxidant capacity of beta-carotene extracts and biomethane yields in a sustainable *Dunaliella salina* biorefinery? *Biomass and Bioenergy*, 191:107474.
- Piera A, Espada JJ, Morales V, Rodríguez R, Vicente G, Bautista LF (2024) Optimised phycoerythrin extraction method from *Porphyridium* sp. combining imidazolium-based ionic liquids. *Heliyon*, 10(14):e34957
- Espada JJ, Rodríguez R, Delgado A, Vicente G, Bautista LF (2024) Assessing environmental sustainability of phytoremediation to remove copper from contaminated soils. *Sustainability*, 16(6):2441.
- Corrales-Pérez B. Vicente G; Morales MP, Gallo-Córdoba A (2024). Magnetic induction heating-assisted synthesis of biodiesel using an alumina/iron oxide nanocatalyst. *Fuel* 368:131659
- Águila-Carricondo A; de la Roche Cadavid JP, Galán PL., Bautista LF; Vicente G (2023) Biofuels New green biorefineries from cyanobacterial-microalgal consortia: Production of chlorophyll-rich extracts for the cosmetic industry and sustainable biogas. *Journal of Cleaner Production* 429, 139652.
- Sánchez-Laso, J; Juan J. Espada, J.J.; Rodríguez, R. Vicente, G; Bautista, L.B (2023). Novel Biorefinery Approach for Phycocyanin Extraction and Purification and Biocrude Production from *Arthrospira platensis*. *Ind. Eng. Chem. Res.*, 62, 5190–5198.
- Sánchez-Laso, J; Piera, A; Vicente, G; Bautista, L.F. Rodríguez, R. Espada, J.J. (2021). A successful method for phycocyanin extraction from *Arthrospira platensis* using [Emim] [EtSO₄] ionic liquid. *Biofuels Bioprod Bioref*, 15 (6): 1638-1649

- Sánchez-Bayo, A.; Megía-Hervás, I.; Rodríguez, R.; Morales, V.; Bautista, L.F.; Vicente, G. (2021). Biocrude from *Nannochloropsis gaditana* by hydrothermal liquefaction: an experimental design approach. *Appl Sci*, 11, 4337.
- Megía-Hervás, I.; Sánchez-Bayo, A.; Bautista, L.F.; Morales, V.; Witt-Sousa, F.G.; Segura-Fornieles, M.; Vicente, G. (2020). Scale-up cultivation of *Phaeodactylum tricornutum* to produce biocrude by hydrothermal liquefaction. *Processes*, 8(9):1072.
- Sánchez-Bayo, A.; Morales, V.; Rodríguez, R.; Vicente, G.; Bautista, L.F. (2020). Cultivation of microalgae and cyanobacteria: Effect of operating conditions on growth and biomass composition. *Molecules*, 25, 2834.
- Sánchez-Bayo, A.; Rodríguez, R.; Morales, V.; Nasirian, N.; Bautista, L.F.; Vicente, G. (2020). Hydrothermal liquefaction of microalga using metal oxide catalyst. *Processes*, 8(1), 15.
- Sánchez-Bayo, A.; López-Chicharro, D.; Morales, V.; Espada, J.J.; Martínez, F.; Astals, S.; Vicente, G.; Bautista, L.F.; Rodríguez, R. (2020) Biodiesel and biogas production from *Isochrysis galbana* using dry and wet lipid extraction: A biorefinery approach. *Renew Energy*, 146, 188-195.
- Espada, J.J.; Pérez-Antolín, D.; Vicente, G.; Bautista, L.F.; Morales, V.; Rodríguez, R. (2019) Environmental and techno-economic evaluation of β -carotene production from *Dunaliella salina*. A biorefinery approach. *Biofuels Bioprod Bioref*, 14, 43-54.
- Montero-Hidalgo, M.; Espada, J.J.; Rodríguez, R.; Morales, V.; Bautista, L.F.; Vicente, G. (2019) Mild hydrothermal pretreatment of microalgae for the production of biocrude with a low N and O content. *Processes*, 7(9), 630.
- Sánchez-Bayo, A.; Morales, V.; Rodríguez, R.; Vicente, G.; Bautista, L.F. (2019) Biodiesel production (FAEEs) by heterogeneous combi-lipase biocatalysts using wet extracted lipids from microalgae. *Catalysts*, 9, 296.

C.2. Congress (Last five years)

- 15 contributions to scientific international congresses in the last five years: 5th Internat. Conference on Biofuels and Bioenergy; 1st International Conference on Novel Photorefineries for Resource Recovery, 7th International Congress on Water, Waste and Energy Management, 1st SEBP Algae Symposium 2024, 29th and 30th European Biomass Conference and Exhibition (EUBCE), International Conference on Algal Biomass, Biofuels and Bioproducts (AlgalBBB 2023), 4th International Conference Bioresource Technology for Bioenergy, Bioproducts & Environmental Sustainability

C.3. Research projects (Last five years)

- Title: Contrato de Ayudante de Investigación.
Funding body: Convocatoria 2024 de ayudas para la contratación de ayudantes de investigación y técnicos y técnicos de laboratorio. Autonomous Government of Madrid
Date, from: 1/03/2025 to 28/2/2027 Budget: 46.000 €
Main researcher: G. Vicente Participation: PI
- Title: Tratamiento Circular de Aguas Residuales con Disruptores Endocrinos usando Microalgas para Bioenergía y Biofertilizantes. ALGAURJC
Funding body: Rey Juan Carlos University.
Date, from: 1/01/2025 to 31/12/2026 Budget: 15.950 €
Main researcher: L.F. Bautista, G. Vicente Participation: PI
- Title: Treatment of pig slurry using photosynthetic anoxygenic and oxygenic technologies for the recovery of carbon and essential nutrients (PURPLEGREEN)
Funding body: Ayudas para la realización de proyectos sinérgico de investigación. Programa de actividades de la I+D+i del ITPS
Date, from: 3/06/2024 to 31/12/2025 Budget: 21.500 €
Main researcher: G. Vicente Participation: PI
- Title: Challenges in hydrothermal liquefaction of waste. Thermo-bio-chemical refinery (THERMOBIOCHEM)
Funding body: Call "Proyectos de Transición Ecológica y Digital". Agencia estatal de Investigación. Ministerio de Ciencia e Innovación
Date, from: 01/12/2022 to 30/11/2024 Budget: 85.370,25 €
Main researcher: L.F. Bautista, G. Vicente Participation: PI
- Title: Subvención del Programa INVESTIGO
Funding body: Autonomous Government of Madrid
Date, from: 28/10/2022 to 27/10/2023 Budget: 34.108,92 €

- Main researcher: G. Vicente Participation: PI
- Title: Ibero-American Network for Wastewater Recycling with Microalgae.
Funding body: Programa Iberoamericano de Ciencia y Tecnología para el Desarrollo.
Date, from: 01/01/2020-31/12/2023 Budget: 115.000 €
Main researcher: J. M. Navarro (UCM) Participation: Responsible URJC
 - Title: Innovative biorefinery from microalgae to bioproducts and biojet fuel (ALGA2BIOPRO JET)
Funding body: Agencia Estatal de Investigación Ministerio de Ciencia e Innovación
Date, from: 01/09/2021 to 31/08/2024 Budget: 115.000 €
Main researcher: L.F. Bautista, G. Vicente Participation: PI
 - Title: Circular economy of microalgae: Advanced Technologies of biorefinery to the production of bioproducts and bioenergy (IND2020/BIO-17344)
Funding body: Autonomous Government of Madrid. Industrial Doctorate with Microalgae Solutions.
Date, from 01/01/2019 to 31/12/2022 Budget: 90.000 € + 60.000 €
Main researcher: G. Vicente Participation: PI
 - Title: Development of microalga technologies for a circular economy (ALGATEC-CM) (P2018/BAA-4532)
Funding body: "Redes de Tecnología". Autonomous Government of Madrid.
Date, from 01/01/2019 to 31/12/2022 Budget: 749.340 €
Main researcher: L.F. Bautista Participation: Researcher
 - Title: Bio-oil and hydrogen production from microalgae through hydrothermal liquefaction process and steam reforming in a membrane reactor (ENE2017-83696-R)
Funding body: Ministry of Economy and Competitiveness.
Date, from 01/01/2018 to 31/12/2020 Budget: 190.000 €. €
Main researcher: J.A. Calles, A. Carrero Participation: Researcher
 - Title: Environmental, energetic and economical assesment of the advanced biofuel production from microalgae (IND2017/IND-7764)
Funding body: Autonomous Government of Madrid. Industrial Doctorate with Alga Energy.
Date, from 01/01/2018 to 31/12/2020 Budget: 70.800 € + 60.000 €
Main researcher: G. Vicente Participation: PI

C.4. Contracts, technological or transfer merits

a) Contracts (Last five years)

- Title: Licuefacción hidrotérmica de lodos de depuradora. Financing Company: Advanced Water and Energy Solutions (Empresa Tractora del Proyecto: Impulsando la Calidad del Agua, Sostenibilidad y Economía Circular a través de un Hub Madrileño de Soluciones Tecnológicas Innovadoras de la Convocatoria 2024 de ayudas para contribuir a la mejora de la cooperación público-privada en materia de I+D+i mediante proyectos de efecto tractor). URJC participation: Subcontracting of the Company Advanced Water and Energy Solutions. Budget (URJC): 80.000 €. Dates: 1/03/2025 - 28/2/2027. Main Researchs: G. Vicente, L.F. Bautista. Participation: PI
- Extracción GRAS de carotenoides de la microalga *Dunaliella salina*. Financing Company: Monzón Biotech S.L. Dates: 14/06/2019-13/12/2019. Principal Investigators: G. Vicente, L.F. Bautista. Participants: URJC.

b) Patents (Last five years)

- Materiales conductores tipo g-C₃N₄ sintetizados a partir de biomasa de microalgas y su método de preparación. Inventors: Ventura, M.; Bautista, L.F.; Rodríguez, R.; Espada, J.J.; Sánchez-Laso, J.; Vicente, G.; Melero, J.A. Reference: ES 2960261 B2. Priority date-country: 02/08/2022-Spain. Extended to International Patent (PCT/ES2023/070495) Countries: Spain, USA.
- Obtención de ficobiliproteínas a partir de microalgas y/o cianobacterias. Inventors: Piera, A.; Sáinz, C.; Morales, V.; Espada, J.J.; Vicente, G.; Bautista, L.F. Reference: P202230714 (application). Priority date-country: 10/11/2023-Spain.