CV date	Jan 2025

Part A. PERSONAL INFORMATION

First name	Carmen		
Family name	Michán		
Gender (*)	Female	Birth date (dd/mm/yyyy)	06/12/1964
Social Security, Passport, ID number			
e-mail	Bb2midoc@uco.es	URL Web	
Open Research and Contributor ID (ORCID)(*)		0000-0003-2921-0987	

(*) Mandatory

A.1. Current position

Position	Full Professor		
Initial date	24/03/2023		
Institution	Universidad de Córdoba		
Departament/Center	Biochemistry and Molecular Biology		
Country	Spain	Teleph. number	+34-957218286
Key words	Transcriptional regulation, stress response, microorganisms, mRNA, molecular biomarkers, pollution, oxidative stress, antioxidant enzymes, oxidative damage, environmental proteomics, redox proteomics, metaproteomics, metagenomics, wastewater		

A.2. Previous positions (research activity interruptions, art. 45.2.c)

Period	Position/Institution/Country/Interruption cause
1988-1992	Pre- and post-doct fellow, E. E. del Zaidín, CSIC, Spain
1992-1994	Post-doct fellow, University of Birmingham, UK
1994-1997	Contratada Reincorporación, E. E. del Zaidín, CSIC, Spain
1997-2023	Contratada Reincorporación, Post-doct fellow, Associate professor, Assistant Prof. Universidad de Córdoba, Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Biology degree	Universidad de Sevilla	1987
PhD in Sciences	Universidad de Granada	1991

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

Regarding publications, 67 are indexed in the Thomson Reuters Web of Science and 84 in Google scholar. 38 were in the first quartile (Q1) and 13 of these in the first decile (D1). 1985 citations, an h-index of 23 and an i10-index of 35. Five Research sections (tramos de investigación) and one Transfer section (tramo de transferencia).

I have worked in different systems but always from a molecular perspective, integrating biochemical, molecular, genetic, and microbiological techniques. Before my graduation, I started my research journey by entering as an inner student in the Department of Biochemistry of the University of Seville and CSIC. Once I graduated, I joined the group of Prof. Juan L. Ramos Martín, at the Estación Experimental del Zaidín (CSIC), where I did my doctoral thesis and a postdoctoral stage working on the study of the biodegradation of aromatic compounds by bacteria of the genus Pseudomonas. During both periods I increased my research experience by doing stays abroad, both short (under the supervision of Prof. KN Timmis in

Braunschweig, Germany, and Prof. P. Williams in Bangor, Wales) and long (with Prof. SWJ Busby in Birmingham, England). Later, I joined the BIO187 group in the Department of Biochemistry and Molecular Biology (Universidad de Córdoba), to which I continue to belong. My interest was directed towards the mechanisms of cellular protection against the aggression by oxidants, in bacteria (*E. coli*) first, and later in yeast / fungi (*S. cerevisiae, C. albicans*, and *D. hansenii*). Currently my work is focused on the evaluation of the response to pollutants in complex aquatic systems, through redox proteomic patterns in multicellular organisms (bivalves, microcrustaceans, etc.), and metagenomic and metaproteomic analysis of the microorganisms present in water and sludge. We have recently opened a new line of research with the aim of analyzing the microorganisms present in cancer, using metagenomics and metaproteomic techniques. I am familiar with a wide range of methodological approaches: quantification of transcription by gene fusions and RT-PCR, promoter-regulator interaction analysis (footprinting and gel retardation assays), cloning of genes and genetic constructs, isolation, selection and sequencing of mutants, directed mutagenesis, immunological techniques including quantitative western blot, determination of enzymatic activities, protein purification, metabolite quantification, determination of oxidized protein levels, redox proteomics, metagenomics and metaproteomics, determination of oxidative damage in biomolecules, etc.

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

C.1. Publications *(see instructions) last 5 years*

Huertas, M.J., **Michán, C.** (2019) Paving the way for the production of secretory proteins by yeast cell factories. Microbial Biotechnol, 12: 1095–1096.

Michán, C., Chicano-Galvez, E., Fuentes-Almagro, C., Alhama, J. (2019) Redox and global interconnected proteome changes in mice exposed to complex environmental hazards surrounding Doñana National Park. Environ. Pollut., 252 (Pt A): 427-439.

Caro, G., Bieber, J., Ruiz-Castilla, F.J., **Michán, C**., Sychrova, H., Ramos, J. (2019) Trk1, the sole potassium-specific transporter in *Candida glabrata*, contributes to the proper functioning of various cell processes. World Journal of Microbiology and Biotechnology, 35(8):124.

Ramos-Moreno, L., Ramos, J., **Michán, C**. (2019) Overlapping responses between salt and oxidative stress in *Debaryomyces hansenii*. World Journal of Microbiology and Biotechnology, 35(11):170.

Siles, J.A., **Michán, C**. (2020) Bacteria, archae, fungi and viruses: it takes a community to eliminate waste. Microbial Biotechnol., 13 (4): 892-894.

Bejaoui, S., **Michán, C**., Telahigue, K., Nechi, S., el Cafsi, M., Soudani, N., Blasco, J., Costa, P-M., Alhama, J. (2020) Metal body burden and tissue oxidative status in the bivalve *Venerupis decussata* from Tunisian coastal lagoons. Marine Environmental Research, 159: 105000.

Reyes, J. Toledo, M., **Michán, C**., Siles, J.A., Alhama, J., Martín, M.A. (2020) Biofiltration of butyric acid: Monitoring odor abatement and microbial communities. Environmental Research 190: 105000,

Ruiz-Castilla, F.J., Bieber, J., Caro, G., **Michán, C**., Sychrova, H., Ramos, J. (2021) Regulation and activity of CaTrk1, CaAcu1 and CaHak1, the three plasma membrane potassium transporters in *Candida albicans*. Biochem Biophys Acta Biomembranes, 1863 (1): 183486.

Michán, C., Blasco, J., Alhama, J. (2021) High-throughput molecular analyses of microbiomes as a tool to monitor the wellbeing of aquatic environments. Microbial Biotechnol, 14 (3): 870-885.

Amil-Ruiz, F., Herruzo-Ruiz, A.M., Fuentes-Almagro, C.A., Baena-Angulo, C., Jiménez-Pastor, J.M., Blasco, J., Alhama, J., **Michán, C.** (2021) Constructing a de novo transcriptome and a

reference proteome for the bivalve *Scrobicularia plana*: Comparative analysis of different assembly strategies and proteomic analysis. Genomics, 113 (3) 1543-1553.
Ruiz-Castilla, F., Rodríguez-Castro, E., **Michán, C**., Ramos, J. (2021) The potassium transporter Hak1 in *Candida albicans*, regulation and physiological effects at limiting potassium and under acidic conditions. Journal of Fungi, 7, 362. https://doi.org/10.3390/jof7050362.
Márquez, P., Herruzo-Ruiz, A.M., Siles, J.A., Alhama, J., **Michán, C**., Martín, M.A. (2021) Influence of packing material on the biofiltration of butyric acid: A comparative study from a physico-chemical, olfactometric and microbiological perspective. Journal of Environmental Management, 294, 113044
Herruzo-Ruiz, A.M., Fuentes-Almagro, C.A., Jiménez-Pastor, J.M., Pérez-Rosa, V.M., Blasco, J., **Michán, C.**, Alhama, J. (2021) Metaomics evaluation of microbial community structure and activity for the environmental assessment of soils: Overcoming protein extraction pitfalls. Environmental Microbiology, 23(8), 4706–4725.
Michán, C., Michán-Doña, A (2021) Viruses: Friends or Foes. Microbial Biotechnology, 15(1), 88–90.
Alhama, J., Maestre, J.P., Martín, M.A., **Michán, C**. (2022) Monitoring COVID-19 through SARS-CoV-2 quantification in wastewater: Progress, challenges and prospects. Microbial Biotechnol, 15(6), 1719–1728.
Márquez, P., Siles, J.A., Gutiérrez, M.C., Alhama, J., **Michán, C**, Martín, M.A. (2022) A comparative study between the biofiltration for air contaminated with limonene or butyric acid using a combination of olfactometric, physico-chemical and genomic approaches. Process Saf Environ Prot, 160: 362-375.
Márquez, P., Gutiérrez, M.C., Toledo, M., Alhama, J., **Michán, C**., Martín, M.A. (2022) Activated sludge process versus rotating biological contactors in WWTPs: Evaluating the influence of operation and sludge bacterial content on their odour impact. Process Saf Environ Prot, 160: 775-785.
Valenzuela-Molina, F., Bura, F.I., Vázquez-Borrego, M.C., Granados-Rodríguez, M., Rufián-Andujar, B., Rufián-Peña, S., Casado-Adam, A., Sánchez-Hidalgo, J.M., Rodríguez-Ortíz, L., Ortega-Salas, R., Martínez-López, A., **Michán, C**., Alhama, J., Arjona-Sanchez, A., Romero-Ruiz, A. (2023) Intraoperative oxygen tension and redox homeostasis in Pseudomyxoma peritonei: a short case series. Front. Oncol., 13:1076500. A
Michán, C. (2023) Picturing natural microbiomes: MALDI mass spectrometry imaging for unravelling the architecture of environmental microbial communities. Environ Microbiol, 25:135–136.
Casares-Jiménez, M., García-García, T., Suárez-Cárdenas, J.M., Pérez-Jiménez, A.B., Martín, M.A., Caballero-Gómez, J., **Michán, C**., Corona-Mata, D, Risalde, M.A., Pérez-Valero, I., García-Bocanegra, I., Rivero, A., Rivero-Juárez, A., Garrido, J.J. (2023) Correlation of hepatitis E and rat hepatitis E viruses urban wastewater monitoring and clinical cases. Sci. Total Environm, 908: 168203.
Vázquez-Borrego, M.C., Granados-Rodríguez, M., Bura, F.I., Martínez-López, A., Rufián-Andújar, B., Valenzuela-Molina, F., Rodríguez-Ortiz, L., Moreno-Serrano, A., Ortega-Salas, R., Pineda-Reyes, R., **Michán, C**., Alhama, J., Romero-Ruiz, A., Arjona-Sánchez, A. (2024) Antitumor effect of a small-molecule inhibitor of KRASG12D in xenograft models of mucinous appendicular neoplasms. Exp. Hematol. Oncol., 12:102.
Gutiérrez, M.C., Cáceres, A., Herruzo-Ruiz, A.M., Siles, J.A., Vázquez, F., Alhama, J., **Michán, C.,** Martín, M.A. (2024) Assessment of nitrification process in a sequencing batch reactor: Modelling and genomic approach Environmental Research, 118035.

Herruzo-Ruiz, A.M., Peralbo-Molina, A., López, C.M., **Michán, C**., Alhama, J., Chicano-Gálvez, E. (2024) Mass Spectrometry Imaging in Environmental Monitoring: from a scarce existing past to a promising future. Trends in Environmental Analytical Chemistry, e00228.
Michán-Doña, A., Vázquez-Borrego, M.C., **Michán, C.** (2024) Are there any completely sterile organs or tissues in the human body? Is there any sacred place? Microbial Biotechnology 17 (3), e14442.
Granados-Rodríguez, M., Bura, F.I., Valenzuela-Molina, F., Rufián-Andújar, B., Martínez-López, A., Rodríguez-Ortiz, L., Ortega-Salas, R., Torres-Martínez, M., Moreno-Serrano, A., **Michán, C**., Alhama, J., Vázquez-Borrego, M.C., Arjona-Sánchez, A., Romero-Ruiz, A. (2024) Breaking the mucin barrier: a new affinity chromatography-mass spectrometry approach to unveil potential cell markers and pathways altered in Pseudomyxoma peritonei. Biological Procedures Online, 26: 13.
Herruzo-Ruiz, A.M., Trombini, C., Moreno-Garrido, I., Blasco, J., Alhama, J., **Michán, C**. (2024) Ions and nanoparticles of Ag and/or Cd metals in a model aquatic microcosm: effects on the abundance, diversity and functionality of the sediment bacteriome. Marine Pollution Bulletin, 204: 116525.
Martín, M.A., Serrano, A., Rincón, B., Gutiérrez, M.A., Amil-Ruiz, F., Barbudo-Lunar, M., Alhama, J., **Michán, C.**, Siles, J.A. (2024) Biomethanisation of sewage sludge: sonication pretreatment and monitoring of microbial communities. Environmental Technology & Innovation, 36: 103750.
Herruzo-Ruiz, A.M., Trombini, C., Sendra, M., **Michán, C**., Moreno-Garrido, I., Alhama, J., Blasco, J. (2024) Accumulation, biochemical responses and changes in the redox proteome promoted by Ag and Cd in the burrowing bivalve Scrobicularia plana. Aquatic Toxicology, 276: 107123.
Michán, C., Prados J., Ramos, J.L. (2025) Bacteria as precision tools for cancer therapy. Microbial Biotechnology, 18:e70090. E

C.2. Congress

108 congress participations, 50 of those in international meetings

C.3. Research projects *(last 5 years)*

Contaminantes emergentes en sistemas costeros: distribución y efectos biológicos, del laboratorio al campo. CTM2016-75908-R. Ministerio de Economía y Competitividad. PI: J. Blasco Moreno. 2016 (4 years). 159.000 €.
Reciclando, reusando y reduciendo: Estrategias químicas, biológicas y energéticas para la sostenibilidad en el ciclo integral del agua. II Edición concurso Mares Circulares 2019. Fundación Chelonia. PI: MA. Martín Santos. 2020 (1 year). 5.400 €.
Estrategias químicas, biológicas y energéticas para potenciar la sostenibilidad en el ciclo integral del agua y plantas de residuos sólidos urbanos. Ayudas a Proyectos de I+D+i Programa FEDER Andalucía 2014-2020. Junta de Andalucía. Convocatoria 2018. PI: MA. Martín Santos & **C. Michán Doña**. 2019 (2 years). 35000 €.
El microbioma ambiental: una herramienta para evaluar el impacto de los contaminantes clásicos y emergentes en áreas costeras. PID2019-110049RB-I00. Ministerio de Ciencia e Innovación. PI: J. Blasco Moreno & J. Alhama Carmona. 2020 (3 years). 150000 €.
Diagnostico global de un ecosistema acuático mediante la integración de técnicas multidisciplinares para establecer un mapa de riesgo. El río Guadalquivir, una oportunidad

para la mejora de la gestión (GUADALTOX). P20_00143. Proyectos de investigación orientados a los retos de la sociedad andaluza. Junta de Andalucía. PI: J. Alhama Carmona. 2021 (1.5 years). 94000 €.
Caracterización y validación de nuevas dianas de diagnóstico, de pronóstico y terapéuticas en Pseudomixoma peritoneal. PI22/01213. Proyectos de I+D+I en salud 2022. Instituto Carlos III. IP: A. Arjona Sánchez & A. Romero Ruiz. 2022 (3 years). 123420 €.
Validation of new therapeutic targets for a rare malignant disease: The Pseudomyxoma Peritonei. PRYES223170ARJO. Proyectos en Investigación AECC. IP: A. Arjona Sánchez. 2022 (3 years). 144801 €.
Red de Investigación sobre Vehículos autónomos e Inteligencia Artificial para la Monitorización de Recursos Hídricos (REINFORCED): Tecnología en Acción. Ayudas a la Constitución y Consolidación de Redes Temáticas. Universidad de Sevilla. PI: D. Gutiérrez Reina. 2023 (1 year). 4000 €.
Evaluación ecotoxico-ómica y multitrófica del riesgo ambiental asociado a los residuos metálicos de productos tecnológicos (Ewaste). PID2022-139807OB-I00. Ministerio de Ciencia e Innovación. PI: J. Blasco Moreno. 2023 (3 years). 225000 €.
New tools for marine environmental monitoring: Omics, ARGs and chemical analysis of emerging and untargeted contaminants (OMICHEMAR). PCM_00118. Plan Complementario de Ciencias Marinas y del Plan de Recuperación, Transformación y Resiliencia. Junta de Andalucía. PI: Julián Blasco Moreno. 2023 (1.5 years). 248.687,50 €.

C.4. Contracts, technological or transfer merits

R&D contracts (last 5 years)

Detección cuantitativa del virus SARS-COV-2 en el agua residual de la red de saneamiento de Córdoba como indicador de alerta temprana de propagación de COVID-19. PI: J. J. Garrido Pavón, **C. Michán Doña** and Mª Á. Martín Santos. 2020 (3 years). 396942,48 €.
Servicio de asesoramiento, transferencia, capacitación y optimización de las técnicas analíticas y metodologías necesarias para la determinación de SARS COV 2 en aguas y lodos, en los laboratorios de EMASESA. PI: **C. Michán Doña** and Mª Á. Martín Santos. 2020 (6 months). 48027,04€.

Others

Positively evaluated in the Incentive Program for the Incorporation and Intensification of Research Activity (I3) in 2006
Reviewer of the journals Journal of Bacteriology, Archives of Microbiology, Journal of Hazardous Materials, Fungal Genetics and Biology, Microbial Biotechnology, Process Biochemistry, Mutation Research - Genetic Toxicology and Environmental Mutagenesis, FEMS Microbiology Letters, Regulatory Toxicology and Pharmacology, Water Research and Science of the Total Environment.
Reviewer of the National Agency for Evaluation and Foresight (ANEP).
Reviewer and Member of the Evaluation Commission of the projects for the 2019 Summer Scientific Campuses. FECYT.
Member of the "Editorial Board" of the journal Microbial Biotechnology (Q1, Microbiology and Applied Microbiology) since 2010.
Editor of "Highlights" in the journal Microbial Biotechnology (Q1, Microbiology and Applied Microbiology) since 2018.