MINISTERIO DE CIENCIA E INNOVACIÓN

Cofinanciado por la Unión Europea

AGENCIA ESTATAL DE INVESTIGACIÓN

CURRICULUM VITAE (CVA)

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

Part A. PERSONAL INFORMATION

CV date	27-01-2023

First name	Micaela		
Family name	Carvajal Alcaraz		
Gender (*)	Woman	Birth date (dd/mm/yyyy)	24-10-1966
Social Security, Passport, ID number	27465729A		
e-mail	mcarvaja@cebas.csic.es	URL Web:	
http://www.cebas.csic.es/dep_spain/nutricion/aquaporinas/aquapo_lineas.html			
Open Researcher and Contributor ID (ORCID) (*)		http://orcid.org/0000-0001-7321-4956	

(*) Mandatory

A.1. Current position

Position	Professor in Science CSIC, Group Leader		
Initial date	29 April 1999		
Institution	Consejo Superior de Investigaciones Científicas- CSIC		
Department/Center	Plant Nutrition	CEBAS-CSIC	
Country	Spain	Teleph. number	968396200 Ext. 6310
Key words	Plant Aquaporins, wáter relations, plant nutrition, nanoencapsulation		

A.2. Previous positions (research activity interuptions, art. 14.2.b))

Period	Position/Institution/Country/Interruption cause
1990-1993	Predoctoral at CEBAS-CSIC
1994-1996	Posdoctoral CSIC-British Council en Long Ashton Research Station (U.K.).
1997-1998	Postdoctoral contract at CEBAS-CSIC

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
BSc. Msc..	University of Murcia, Spain. Mayor-Biology	1989
MASTER: Science and Water Technology	Euro-mediterranean Water Institute (IEA) and EMUNI University (Slovenia).	1991
PhD	University of Murcia	1992
MsD.	Entrepreneurs for Technology Base Companies. Business School, Madrid (Spain)	2009

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

Micaela Carvajal Alcaraz has MsC in Biology in 1989 by the Faculty of Biology of the University of Murcia. In 1991 had got a Master degree in Water Science and Technology by the Water Institute in 1992 finish the PhD in Biology in the University of Murcia. She did a postdoctoral stay at Long Ashton Research Station, Bristol (UK). Later, in 2009 she finished a Ms in Entrepreneurs for Technology Base Companies. by Business School, Madrid. Since 1999 regular staff at CEBAS-CSIC and since 2009 is Professor in Science.

During the postdoctoral stay she started to work in the line with studies of nutrients on the functionality of aquaporins. After her integration to Spain, she demonstrated her leadership

developing for first time in Spain the studies of the functional involvement of aquaporins in plants. In which she has worked mainly focus on the study of salinity and water absorption through aquaporin. The research lines are based on the study of water transport mechanisms in plants under abiotic stress conditions. This will allow us to optimize the absorption of water by plants; aquaporins used as markers of resistance to salinity and determine the water needs of plants in response to climate change. On the other hand, the biochemistry and biophysics of cell membranes characterization allow us to study the industrial application. She created the group of Aquaporins in the CSIC. She internationally collaborated continuously with the main researchers in aquaporins in the world as Prof. Francois Chaumont at Louvain Institute of Biomolecular Science and Technology (Belgium), Prof. Christophe Maurel at Biochemistry & Plant Molecular Physiology (UMR CNRS - INRA - SupAgro - Université Montpellier, France), Urban Johanson (Lund University, Sweden) and Janusz Zwiazek (University of Alberta, Canada).

During her research activity she has more than 154 SCI publications (80% in Q1), 40 book chapters and 70 collective volumes. He has participated in 49 competitive research projects, 31 as coordinator

According to the transference of Technology, since 2009 participated as promotor in technology-based company (SPIN-OFF-CSIC) Aquaporins & Ingredients, S.L. and from 2018 in AQP-Dermoactivity S.L. Also, she has collaborated in 12 projects with enterprises (Retos-Colaboración, PdC, CDTI-CIEN, CDTI-MISIONES..) and she has 5 PATENTS licensed to industry. She got the Transference Sexenio in 2020. Also she has a good impact in the science dissemination with 7 newspaper articles in the last five years and 3 publications in non-scientific journals. She has belonged to Advisory committees of STOA and to Spanish scientific to advise European and Spanish Parliament. She is actually the President of the +Broccoli Association.

She has supervised 11 doctoral Theses and 7 are now running. All supervised PhD students are now in high level responsibility positions among industry and university. She has supervised 15 foreign PhD and postdocts students.

She was awarded with several prizes: Young Scientist FRANCISCO SABATER in 2001 by the Spanish Society of Plant Physiology Scientist WOMAN AWARD MURCIA 2005 and Transference of Technolgy in 2012, both by the Autonomous Community of the Region of Murcia.

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

C.1. Publications *(10 max).* **Selected Publication of the last 5 years**

Martínez-Ballesta, M.C., García-Gomez, P. Yepes-Molina, L Guarnizo, A.G. Teruel, J.A. **Carvajal, M.** (2018) Plasma membrane aquaporins mediates vesicle stability in broccoli. Plos One. February 8, 2018 https://doi.org/10.1371/journal.pone.0192422

Juan José Rios, Paula Garcia-Ibañez, **Micaela Carvajal.** (2019). The use of biovesicles to improve the efficiency of Zn foliar fertilization. Colloids and Surfaces B: Biointerfaces. Volume 173, 899-905. DOI: 10.1016/j.colsurfb.2018.10.057

Yepes-Molina L, Martínez-Ballesta MC, **Carvajal M**. (2020) Plant plasma membrane vesicles interaction with keratinocytes reveals their potential as carriers. Journal of Advanced Research. Feb 8;23:101-111. doi: 10.1016/j.jare.2020.02.004. n.6, 2020.

Barzana, Gloria; Rios, Juan Jose; Lopez-Zaplana, Alvaro; Nicolas-Espinosa, Juan; Yepes-Molina, Lucia; Garcia-Ibanez, Paula; **Carvajal, Micaela.** (2020) Interrelations of nutrient and water transporters in plants under abiotic stress. Physiologia Plantarum. https://doi.org/10.1111/ppl.13206

Garcia-Ibañez, P., Nicolas-Espinosa, J., Carvajal, M. (2020) Plasma membrane vesicles from cauliflower meristematic tissue and their role in water passage. BMC Plan Biology. **DOI :** 10.1186/s12870-020-02778-6

Yepes-Molina, L., Hernández, J.A., **Carvajal, M**. (2021) Nanoencapsulation of Pomegranate Extract to Increase Stability and Potential Dermatological Protection. Pharmaceutics 2021, 13, 271.

Paula Garcia-Ibañez, Carles Roses, Agatha Agudelo, Fermin I. Milagro, Ana M Barceló, Blanca Viadel, Juan Antonio Nieto, Diego A Moreno, and **Micaela Carvajal.** (2021). The influence of red cabbage extract nanoencapsulated with brassica plasma membrane

vesicles on the gut microbiome of obese volunteers. Foods, 10, 1038.https://doi.org/10.3390/foods10051038.

Yepes-Molina L, **Carvajal M**. Nanoencapsulation of sulforaphane in broccoli membrane vesicles and their *in vitro* antiproliferative activity. Pharm Biol. 2021 Dec;59(1):1490-1504. doi: 10.1080/13880209.2021.1992450.

Rios Juan J., Lopez-Zaplana Alvaro, Bárzana Gloria, Martinez-Alonso Alberto, **Carvajal Micaela** (2021). Foliar Application of Boron Nanoencapsulated in Almond Trees Allows B Movement Within Tree and Implements Water Uptake and Transport Involving Aquaporins Frontiers in Plant Science,12, 2373. DOI=10.3389/fpls.2021.752648

Lopez-Zaplana A., G. Bárzana, L. Ding, F. Chaumont, M. Carvajal, (2022) Aquaporins involvement in the regulation of melon (Cucumis melo L.) fruit cracking under different nutrient (Ca, B and Zn) treatments, Environmental and Experimental Botany, Volume 201,https://doi.org/10.1016/j.envexpbot.2022.104981.

Nicolas-Espinosa, J and **Carvajal M** (2002) Genome-wide identification and biological relevance of broccoli aquaporins.The Plant Genome, ;15:e20262. https://doi.org/10.1002/tpg2.20262

C.2. Congress

National

-VII Congreso Iberico de Agroingeniería y Ciencias Hortícolas. August 2013, Madrid. 1 Poster.
-XII Reunión de Biología Molecular de las Plantas. Cartagena (Murcia), June of 2013. 1 Poster.
-XIV Simposio Ibérico de Nutrición Mineral de las Plantas. December 2014, Lisboa. 1 Plenary conference
-Congreso Nacional de Biotecnología (Biotec 2017). June 2017. Murcia (España). 2 Posters.
-Congreso Nacional de Biotecnología (Biotec 2021). June 2021. Murcia (España). 4 Oral.
- .Meeting Of Plant Molecular Biology XVI RBMP14th-16th September 2022, Sevilla, Spain. 2 posters

- **International**

-European Biotechnology Congress. 28 September -1 October 2011. Istanbul, Turkey. 1 poster
-Viena International Plant Conference Association. Plant Abiotic Stress Tolerance II. Viena 2012. Austria. 2 póster
-Congreso de Medellin IICTA 2014. 1 poster
-1rst FoodTech2014 Congress. Servia.: 1 oral.
- Future Trends in Phytochemistry in the global era of agri-food and health: Phytochemical Society of Europe. April 2015. San Pedro del Pinatar, Murcia, Spain. 1 Plenary conference 1 oral y 1 Chair.
- SRUK/CERU - VII International Symposium –Junio 28-30 Liverpool 2019 Plenary conference.
- 8th International Workshop on Plant Membrane Biology. 7-12 Julio de 2019 en Glasgow, UK. Partcipación: 2 oral presentations and 1 poster.
-1st International Conference on Advanced Production and Processing 10th-11th October 2019 Novi Sad, Serbia. Plenary conference.
- The 2nd International Electronic Conference on Plant Sciences (1-15 Dec 2021)-4 Oral presentation and 4 postes

C.3. Research projects during the last five years

1-Title: Support for proposals preparation as coordinator in the Horizon 2020 program on the topic: Strategies for crop productivity, stability and quality Sustainable Food Security.
Organism: Ministerio de Economía y Competitividad (EUIN2013-51050).
Starts and ends 2014- 2017
Project leader: Micaela Carvajal Alcaraz.Fundings: 20120 euros

2-Title: GENETIC IMPLEMENTATION OF BRASSICA VARIETIES IMPROVING BIOTIC AND ABIOTIC RESISTANCE
Organism: Ministerio de Economía y Competitividad (Retos-Colaboración 2015- RTC-2015-3536-2). Starts and ends 2015- 2018
Project leader: Micaela Carvajal Alcaraz.Fundings: 210.000 euros.

3.-Title: STUDY OF CAKILE MARITIMA CROP FOR CULTIVATION IN MARITIME COASTAL AREAS FOR OBTAINING LIPID COMPOUNDS AND BIOENERGY

Organism: Cooperation with Tunisia-CSIC. Programa i-COOP+ 2015(COOPA20120). Starts and ends 2016- 2017. Project leader: Micaela Carvajal Alcaraz. Fundings: 17750 euros
4-Title: NANOTECHNOLOGIES OF PLANT MEMBRANE VESICLE ADAPTATION FOR STABILIZATION AND CARRIER POMEGRANATE BIOACTIVE COMPOUNDS
Organism: Ministerio de Economía y Competitividad (AGL2016-80247-C2-1-R). Starts and ends 2017- 2019
Project leader: Dra. Micaela Carvajal.Fundings: 90.000 euros
5- Title: Development and application of new tecnologies for controling phisiopaties in melon, broccoli and pack choi
Organism: Ministerio de Ciencia, Innovación y Universidades (Retos-Colaboración RTC-2017-6119-2).
Project leader at CEBAS-CSIC: Dra. Micaela Carvajal
Starts and ends 2018-2021.Fundings: 210.242 euros
6- Titulo: Nanotechnologies for encapsulation of mineral nutrients and foliar applicaion.
Organism: Ministerio de Ciencia, Innovación y Universidades (Retos-Colaboración RTC-2017-6544-2).
Project leader at CEBAS-CSIC: Dra. Micaela Carvajal
Starts and ends 2018-2021.Fundings: 229.951 euros
7-Title: NANOTECHNOLOGIES OF PLANT MEMBRANE VESICLE ADAPTATION FOR STABILIZATION AND CARRIER POMEGRANATE BIOACTIVE COMPOUNDS
Organism: CSIC. EXTENTION of the Project previosly funded by Ministerio de Economía y Competitividad (AGL2016-80247-C2-1-R).
Project leader: Dra. Micaela Carvajal
Starts and ends 2020- 2020.Fundings: 7.000 euros
8-Title: Implementación del procedimiento para estimular de la síntesis de glucosinolatos en brocoli por medio de la aplicación foliar elicitadores
Organism: Fundación Séneca-CARM (Autonomous Community of the Region of Murcia) (21094/PDC/19).
Project leader: Dra. Micaela Carvajal
Starts and ends 2020- 2020.Fundings: 27.500,00 euros.
9-Title: Sustainable agriculture with zero nitrate waste to Mar Menor.
Organism: CARM (Autonomous Community of the Region of Murcia) (**RIS3MUR**). (21094/PDC/19).
Project leader: Dra. Micaela Carvajal
Starts and ends 2020- 2022.Fundings: 87.500,00 euros.

C.4. Contracts, technological or transfer merits
Contracts under PI Micaela Carvajal Alcaraz
1- Producción y desarrollo de ingredientes vegetales encapsulados con efecto beneficioso en la microbiota humana. SAKATA SEED IBERICA, S.L.U CDTI. 2018-2021. 84.267 Eur
2- Estudio fisiológico de desarrollo de brotes y germinados. Elicitación para enriquecer en minerales y bioactivos. Aquaporins & Ingredients, S.L.-INFO (CARM). 2018-2020. 17.400 Eur
3-Bioestimulación de la actividad transportadora de las acuaporinas en fruta de hueso. Fenix Fresh, S.L.-CDTI. 2019-2022. 45.000 Eur
4-Diferenciación funcional de los subproductos del brócoli como base para su aplicación cosmecéutica. AGROPEYFI, S.L.-CDTI. 2019-2021. 30.000 Eur
5- Interrelación de la microflora del suelo y los canales moleculares de transporte de membrana. JAVALOYES S.A.-CDTI. 2020-2022. 60.000 Eur
6.- Nueva generación de sistemas de aprovechamiento energético de biomasas residuales sin emisiones. Hacia fuentes energía negativas en carbono" (CDTi). Proyecto MISIONES.Subcontratación al CEBAS-CSIC: 2 CONTRATOS DE 190.000 euros

-**Five Patents** with international extention: Europe, USA, Japan. 2 lisenced to Aquaporins&Ingredients, S.L. 1 lisenced to AQP Dermoactivity S.L.; 1 lisenced to SAKATA S.L.U.; 1 lisenced to Agorpeyfi S.A

2009- actual. **Technology entrepreneur, investor of TECHNOLOGY-BASED COMPANY** (Spin-Off-CSIC) Aquaporins & Ingredients, S.L. 2018- AQP-Dermoactivity, S.L.