CURRICULUM VITAE (CVA)

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

CV date	14/01/2025

Part A. PERSONAL INFORMATION

First name	Andrés A.		
Family name	Borges-Rodríguez		
Gender (*)	Male	Birth date (dd/mm/yyyy)	21/05/1966
Social Security, Passport, ID number			
e-mail	aborges@ipna.csic.es	URL Web	https://www.ipna.csic.es/en/research-line/chemical-activators-natural-plant-defences
Open Research and Contributor ID (ORCID)(*)		0000-0003-4398-2836	

(*) Mandatory

A.1. Current position

Position	TSE OPIs/Leader of research line on Chemical Plant Defence Activators		
Initial date	2010		
Institution	CSIC (Spanish National Research Council)		
Departament/Center	Life & Earth Sciences/Institute of Natural Products and Agrobiology		
Country	Spain	Teleph. number	+34 922 474336
Key words	Plant resistance induced, chemical plant defence activators, priming, biotic stress, abiotic stress		

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

Period	Position/Institution/Country/Interruption cause
2010	Técnico Superior Especializado (TISU) CSIC/OPI
2006-2009	I3P Doctores position/CSIC
2001-2002	*Postdoc*/Rothamsted Research/UK

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Chemistry Sc degree	University of La Laguna/Spain	1991
Master degree	University of La Laguna/Spain	1994
Chemistry Sc, *PhD*	University of La Laguna/Spain	1999

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

Dr Borges completed his *PhD* at the IPNA-CSIC and carried out a *postdoc* stay at the prestigious experimental station **Rothamsted Research** (UK), under the supervision of Prof. John Lucas. Currently, Dr Borges carries out his research work at IPNA-CSIC, as leader of the research group on ***Chemical Plant Defence Activators***. The objectives of the group focus on the characterization at physiological, biochemical and molecular level of the defence mechanisms induced by non-toxic chemical compounds capable of inducing a *priming* effect in the plant against biotic and abiotic stresses, such as the water-soluble derivative of vitamin K3 known as menadione sodium bisulphite (MSB). Dr Borges is co-author of **45 publications**, including **14 high impact (D1) papers in the las 10 years**. He has participated as part of the research team or as principal investigator in research contracts with private companies, in projects of the Spanish National Research and the Canary Islands Government Research Agencies, being also principal investigator of a competitive regional project and **Managing Director and PI of an EU project**, MAC-INTERREG programme financed with FEDER funds. In 2014, Dr Borges was **Guest Editor of a topic** *Induced Resistance for Plant Defence* of the Open Access journal *Frontiers in Plant Science*, in which twelve high impact papers were published by the most distinguished specialists in this line of research. Dr Borges is inventor of **seven patent applications**, **four** of which are currently **licensed** to several **agro-companies** and are being commercially exploited in more than 30 countries. **CSIC's royalty income** has been approximately **800,000€**. Among the two more relevant patent licensing contracts, one of them (patent 2010) is the application of compositions which contain menadione to control the psyllid vectors of HLB, a bacterial citrus disease present in 4 continents and considered to be the greatest threat to this important crop worldwide, and registered in Spain, has been internationally extended to Mexico, Brazil, Chile, South Africa and Australia. Another patent licensing contract (2016) on the use of non-proline cyclic amino acids to increase tolerance to osmotic stress conditions (drought) has been extended to more than 20 countries in addition to Spain, including an EU patent. Dr Borges has supervised as **Director** of **four *PhD* research projects in the last 10 years** and four Master degrees, which have resulted in publications in *Environmental and Experimental Botany*, *Frontiers in Plant Sciences*, *Plant Biotechnology Journal*, *BMC Biology*. Two of these ***PhD* students have got prestigious fellowships/contracts** such as Marie Curie (David Jiménez-Arias) and a postdoc position in the Sainsbury lab at Cambridge University (Marino Expóxito-Rodríguez). He also has supervised a number of international Erasmus+ traineeship students and contributed as referee in several high impact journals in Plant Science such as *Plant Biotechnology Journal*, *Frontiers in Plant Science* or *Plants* as well as external reviewer in *PhD* thesis for Universidad de La Laguna, Universidad de Valencia, Universidad Politécnica de Valencia and University of Lancaster (UK); expert reviewer for Spanish Research Agency(AEI), Spanish Innovation Certification Agency (ACIE); project 'evaluator of the Junta de Andalucía and EU project Horizon2020.

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

C.1. Publications: *corresponding author

- Mayra Sanchez-Olvera, Constanza Martin-Vasquez, Cristian Mayordomo, Jonatan Illescas-Miranda, Mar Bono, Alberto Coego, Jana Alonso, Mercedes Hernández-González, David Jiménez-Arias, Javier Forment, Armando Albert, Antonio Granell, **Andrés A. Borges***, Pedro L. Rodriguez*.ABA-receptor agonist iSB09 decreases soil water consumption and increases tomato CO2 assimilation and water use efficiency under drought stress. *Environmental and Experimental Botany* 225 (2024) 105847. https://doi.org/10.1016/j.envexpbot.2024.105847
- David Jiménez-Arias, Sarai Morales-Sierra , Emma Suárez , Jorge Lozano-Juste , Alberto Coego , Juan C Estevez , **Andrés A Borges** , Pedro L Rodriguez. Abscisic acid mimic-fluorine derivative 4 alleviates water deficit stress by regulating ABA-responsive genes, proline accumulation, CO2 assimilation, water use efficiency and better nutrient uptake in tomato plants. *Front. Plant Sci*., 8 June 2023 Volume 14 – 2023. https://doi.org/10.3389/fpls.2023.1191967
- Sarai Morales-Sierra, Juan C Luis, David Jimenez-Arias, Nereida Rancel-Rodrıguez, Alberto Coego, Pedro L Rodriguez, Mercedes Cueto, and **Andrés A Borges***. Biostimulant activity of *Galaxaura rugosa* seaweed extracts against water deficit stress in tomato seedlings involves

activation of ABA signaling. *Front. Plant Sci*., 14 September 2023 Volume 14 2023. https://doi.org/10.3389/fpls.2023.1251442

- Francisco J García-Machado, Ana L García-García, **Andrés A Borges***, David Jiménez-Arias*. Root treatment with a vitamin K3 derivative: a promising alternative to synthetic fungicides against *Botrytis cinerea* in tomato plants. *Pest Management Science* 2022, 78:974-981 https://doi.org/10.1002/ps.6707
- David Jiménez-Arias, Alba E. Hernándiz, Sarai Morales-Sierra, Ana L. García-García, Francisco J. García-Machado, Juan C. Luis and Andrés **A. Borges***. Applying Biostimulants to Combat Water Deficit in Crop Plants: Research and Debate. *Agronomy* 2022, 12, 57 https://doi.org/10.3390/agronomy12030571
- Alba E. Hernandiz, David Jiménez-Arias, Sarai Morales-Sierra, **Andres A. Borges** and Nuria De Diego. Addressing the contribution of small molecule-based biostimulants to the biofortification of maize in a water restriction scenario. *Frontiers in Plant Science* 2022, 13:944066 https://doi.org/10.3389/fpls.2022.944066
- David Jiménez-Arias, Francisco J. García-Machado, Sarai Morales-Sierra, Ana L. García-García, Antonio J. Herrera, Francisco Valdés, Juan C. Luis and **Andrés A. Borges*.** A Beginner's Guide to Osmoprotection by Biostimulants (2021). Plants 2021,10(2), 363; https://doi.org/10.3390/plants10020363
- David Jiménez-Arias, Francisco J.García-Machado, Sarai Morales-Sierra, Juan C.Luis, Emma Suarez, Mercedes Hernández, Francisco Valdés, and **Andrés A. Borges***. Lettuce plants treated with L-pyroglutamic acid increase yield under water deficit stress. *Environmental Experimental Botany* 157 (2019): 215-222. https://doi.org/10.1016/j.envexpbot.2018.10.034
- David Jiménez-Arias, Francisco J. García-Machado, Juan C. Luis, **Andrés A. Borges***. Menadione Sodium Bisulphite (MSB): beyond seed-soaking. Root pretreatment with MSB primes salt stress tolerance in tomato plants. *Environmental and Experimental Botany* 157(2019):161-170. https://doi.org/10.1016/j.envexpbot.2018.10.009
- Estefanía Carrillo-Perdomo, David Jiménez-Arias, Angel Aller, and **Andrés A. Borges** (2016) Menadione Sodium Bisulphite (MSB) enhances the resistance response of tomato leading to repel mollusc pests. *Pest Management Science* 72:950-960. 10.1002/ps.4074
- David Jiménez-Arias, José A. Pérez, Juan C. Luis, Vanesa Martín-Rodríguez, Francisco Valdés-González and **Andrés A. Borges***. Treating seeds in menadione sodium bisulphite primes salt tolerance in Arabidopsis by inducing an earlier plant adaptation. *Environmental Experimental Botany* 109 (2015) 23-30. 10.1016/j.envexpbot.2014.07.017
- **Andrés A. Borges***, David Jiménez-Arias, Marino Expósito-Rodríguez, Luisa M. Sandalio and José A. Pérez. Priming crops against biotic and abiotic stresses: MSB as a tool for studying mechanisms. *Frontiers in Plant Science* 5 (2014) 642. https://doi.org/10.3389/fpls.2014.00642

C.2. Congress

- *AlgaEurope 2023*. Praga, diciembre 2023. *Galaxaura rugosa* seaweed extracts against water deficit stress in tomato seedlings involves activation of ABA signaling. (presentación oral invitada)
- *Sustainable and Precision Agriculture Symposium 2022. Tenerife, julio 2022; Título:* Contribution to water saving in crops through the application of macroalgae extracts (organizadores y poster virtual)
- *Symposium "Agriculture and Food Sustainability: New Climate Change Scenarios*, Funchal, Madeira (Portugal), October 11-13, 2021; Organizador: Universidad de Madeira; Título: Root treatment with menadione sodium bisulfite induces resistance against Botrytis cinerea in tomato plants: A sustainable fungicide alternative (presentación oral)

- *XIV International Plant Water Relations Symposium,* Madrid October 3-5th,2018; Organizer: Sociedad Española de Fisiología Vegetal; Título: Pre-treatment with L-piroglutamic acid induces drought tolerance in lettuce (presentación oral)
- *XXII Reunión de la Sociedad Española de Fisiología Vegetal and XV Congreso Hispano- Luso de Fisiología Vegetal,* Barcelona June 26-29th, 2017; Título: Priming effect of menadione sodium bisulphite against salinity stress in Arabidopsis involves epigenetic changes in genes controlling proline metabolism (presentación oral)

C.3. Research projects

1. Título: *Mitigation of climate change and adaptation to water deficit in agriculture through the use of biostimulants and regulators of plant transpiration* (BIOTRANS). TED2021- 129867B-C22; 143.750€ Next GenerationEU/PRTR. **Participación: IP**. Fecha inicio-fin: 2022-2024
2. Título: *Contribution to water saving in strategic crops for the primary sector in the Canary Islands and Madeira through the application of bioactive natural products and extracts with osmoprotective properties* (MAC-INTERREG 2014-2021, MAC2/1.1b/279) Financiación: FEDER 576.400,40€; **Participación**: **IP**; Fecha inicio-fin: 2019-2023
3. Título: *Exploitation of brines from desalination processes in non-soil cultivation systems for application to the hotel sector*; Fundación Cajacanarias (2016TUR02); 36.000€; **Participación: IP**; Fecha inicio-fin: 2017-2019.
4. Título: *Comprehensive study of plant defence induced by exogenous application of fluorescent derivatives of MSB, vitamin K3 and sodium bisulphite (ProID2020010082)* Proyecto Gobierno de Canarias con Fondos FEDER; 67.000€; **Participación: equipo de investigación**; Fecha inicio-fin: 2020-2022

C.4. Contracts, technological or transfer merits
C.4.1 Patent applications:

1. **WO2017158225A1** *Use of cyclic non-prolinic amino acids to increase plant tolerance to osmotic stress conditions*; Holder: CSIC (60%), University of La Laguna (40%); PCT: EU, Brazil, India, Mexico, Morocco, Peru, South Africa, Turkey, Egypt; Status: **Licenced**
2. **WO2012045901A2** *Compositions for the control of the pests Tryoza and Diaphorina citri, vectors of the bacterium of the genus Candidatus Liberibacter, the causal agent of the most serious citrus disease known as Huanglongbing (HLB)*; Holder: CSIC; PCT: Australia, Brazil, Chile, Mexico and Spain; Status: **Licenced**
3. **WO2010018281A1** *Use of menadione for inducing tolerance against salt stress*; Inventors: Andrés Borges Rodríguez, Andrés Borges Pérez, David Jiménez Arias, Marino Expósito Rodríguez, Vanesa Martín Rodríguez, Juan Cristo Luis Jorge; Application: Registry: Spain; Status: **Licenced**
4. **WO2009024634A1** *Use of compositions containing menadione and / or one or more of its water-soluble derivatives in order to induce in the treated crops an improvement of its fruits to handling and transport*; Inventors: Andrés Borges Rodríguez, Andrés Borges Pérez, Marino Expósito Rodríguez. Registry: Spain; Status: **Licenced**

C.4.2 Contracts

Technological Support Contract. Subproject CDTI company Biovert, SA BIOVERT, SA. Principal Investigator: Andrés A. Borges Rodríguez. 2013-2014.Budget: 14,000 €.

Collaboration Agreement between the CSIC and Fundación CajaCanarias for the study of Chemical Activators of Plant Defences. Principal Investigator: A. Borges Rodríguez. 2006-2009.Budget: 42,000 €.