

ABBREVIATED CV Date	04/12/2023
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Part A. PERSONAL INFORMATION

First Name *	ROSA ELENA		
Family Name *	CARDOZA SILVA		
Sex *	Female	Date of Birth *	26/03/1965
ID number Social Security, Passport *	71450059F	Phone Number *	(34) 987 442 026
URL Web			
Email Address	re.cardoza@unileon.es		
Researcher's identification number	Open Researcher and Contributor ID (ORCID) *	0000-0002-6589-0062	
	Researcher ID	E-2608-2018	
	Scopus Author ID	6603620118	

* Mandatory

A.1. Current position

Job Title	Assistant Professor Doctor		
Starting date	Since October 2023		
Institution	University of León, Campus of Ponferrada		
Department / Centre	Molecular Biology/Microbiology Area		
Country	Spain	Phone Number	+34 690 209 755
Keywords	<i>Trichoderma</i> , Trichothecenes, Mycotoxins, Biocontrol, Molecular plant-microbe interaction		

A.2. Previous positions

Period	Job Title / Name of Employer / Country
2020-2023	Laboratory Technician Specialist/University of León
2008 - 2020	Laboratory Officer / University of León
2002 - 2005	Postdoctoral Researcher / University of Salamanca
1999 - 2001	Postdoctoral Researcher / Institute of Biotechnology of León (INBIOTEC) / Spain
1994 - 1998	Research Collaborator / Institute of Biotechnology of León (INBIOTEC) / Spain
1990 - 1993	Predoctoral fellow for doctoral studies at the University of León, Spain / National Autonomous University of México (UNAM) México.

A.3. Education

Degree/Master/PhD	University / Country	Year
Ph.D. in Biology	University of León / Spain	1998
Homologation Credential of the Biologist Title from UNAM (México), to the Spanish title of Title of Biology	Ministry of Education and Culture. Technical General Secretariat.	1998
Post-Graduate in Biology	Science Faculty. National Autonomous University of México (UNAM) México.	1989
Graduate in Biology	Science Faculty. National Autonomous University of México (UNAM) México.	1987

A.4. General quality indicators of scientific production

- Total citations: **2084** (Web of Science)
- Publications in the 1st Quartil (Q1): **43**
- Web of Science h-index: **27**
- Scopus h-index: **29**
- Positive Evaluation of the National Agency for Quality Evaluation and Accreditation (ANECA), in the contractual figures of **Contracted Professor Doctor** and **Assistant Professor Doctor** (December 29, 2003). Favorable report from the National Agency for Quality Assessment and Accreditation (ANECA), in the contractual figure of Collaborating Professor (December 29, 2003).

Part B. CV SUMMARY

My professional career began in 1987, when, after finishing my studies in Biology at the UNAM University in Mexico City, I joined to the Industrial Microbiology Laboratory to develop a project focused on studying the regulation of penicillin synthesis in *Penicillium chrysogenum*. Since then, I have dedicated most of my professional activity to the study of secondary metabolites of fungal origin. In 1990, after finishing my Grade in Biology, I was granted with a fellowship from my University (UNAM) to perform PhD studies at the University of León (Spain), in a project related to the characterization of cephamycin C biosynthesis, a compound that belongs to the beta-lactam class of antibiotics. Once finished my PhD, I joined as a postdoctoral researcher to the Institute of Biotechnology in León, where I became part of a group, which was mainly focused on projects related to the overproduction of proteins of plant or animal origin in filamentous fungi. Most of these projects were financed by different companies and resulted in two patents with application in the food industry, in addition to different scientific publications. From 2002 to the present date, I am part of the working group led by Dr. Santiago Gutiérrez, and I have actively participated in the development in several biochemical and molecular techniques to detect and characterize metabolites with antibiotic activity produced by *Trichoderma* spp., more specifically, in the analysis of a group of sesquiterpene metabolites known as trichothecenes in *T. arundinaceum* and *T. brevicompactum* strains. These projects have been performed also in collaboration with groups of remarkable national and international relevance.

Thanks to these works, currently, I am a member or a multidisciplinary group of microbiologists and agronomists (crop production) that has been recognized as the Research Consolidated Unit number 264 by the Regional Government of "Castilla y Leon (Spain)". As a result of these years of work, I authored 9 book chapters, 62 articles in SCI journals (average IF > 3.5) (H-index: 26, source WOS), 8 non-SCI journals articles, 3 patents [2 International (1 PCT, 1 European) and 1 National]. I have supervised 3 Ph.D. Thesis and 3 Grade ("Tesis") works. Author of 63 Congress communications (34 International and 29 national), and I reviewed 55 articles for 30 different SCI International Journals. I have participated in 18 research & development projects financed in public announcements and in 2 research & development contracts with companies.

Since October of this year, Professor responsible for the subject of Microbiology and Immunology at the Faculty of Health Sciences at the Ponferrada Campus of the University of Leon.

Part C. RELEVANT ACCOMPLISHMENTS (Between 2013-2023).

- **32** SCI articles (**26** Q1).
- Author of **4** book chapters, and **2** non-SCI journal articles.
- **15** Communications to Scientific Congress (**9** International and **6** National).
- Research member of **7** National and Regional projects.
- Member of the Consolidated Research Unit (UIC) number 264 (2018-today) of the "Junta de Castilla y León" (Spain).

C.1. Publications (10 selected in the last 10 years). (Q1= first quartile; D1= first decile).

1. **Cardoza, R. E.**; McCormick, S.P.; Lindo, L.; Mayo-Prieto, S.; González-Cazón, D.; Martínez-Reyes, N.; Carro-Huerta, G.; Rodríguez-González, A; Proctor, R. H.; Casquero, P. A.; Gutiérrez, S. (2022). Effect of

- Farnesol in *Trichoderma* Physiology and in Fungal–Plant Interaction. Special Issue: Application of *Trichoderma* Strains and their Metabolites in Agriculture. *J Fungi*. Nov. 8(12):1266-1286. Doi: <https://doi.org/10.3390/jof8121266>. ISSN: 2309-608X. JCR: 6,413 (2021), Mycology, Q1.
2. **Cardoza, R. E.**; Mayo-Prieto, S; Martínez-Reyes, N; McCormick, S.P.; Carro-Huerga, G.; Campelo, M.P.; Rodríguez-González, A.; Lorenzana, A.; Proctor, R.H.; Casquero, P. A.; Gutiérrez, S. (2022). Effects of trichothecene production by *Trichoderma arundinaceum* isolates from bean-field soils on the defense response, growth and development of bean plants (*Phaseolus vulgaris*). *Front Plant Sci*. Nov. 13:1005906. <https://doi.org/10.3389/fpls.2022.1005906>. ISSN: 1664-462X. JCR: 6,627, Plant Science, Q1.
 3. **Cardoza, R. E.**; McCormick, S. P.; Izquierdo-Bueno, I.; Martínez-Reyes, N; Lindo, L.; Brown, D. W.; Collado, I. G.; Proctor, R. H.; Gutiérrez, S. (2022). Identification of polyketide synthase genes required for aspinolide biosynthesis in *Trichoderma arundinaceum*. *Appl Microbiol Biotechnol*. Nov. 106(21):7153-7171. <https://doi.org/10.1007/s00253-022-12182-9>. ISSN: 0175-7598. JCR: 5,365 (2021), Biotechnology and Applied Microbiology, Q1.
 4. Gutiérrez, S.; McCormick, S. P.; **Cardoza, R. E.**; Kim, H-S; Lindo, L.; Vaughan, M. M.; Carro-Huerga, G.; Busman, M.; Sáenz de Miera, L-E.; Jaklitsch, W. M.; Zhuang, W. Y.; Wang, Ch.; Casquero, P. A.; Proctor, R. H. (2021). Distribution, Function, and Evolution of a Gene Essential for Trichothecene Toxin Biosynthesis in *Trichoderma*. *Front Microbiol*. Dec. 12:791641. doi: 10.3389/fmicb.2021.791641. ISSN 1664-302X. JCR: 5,640, Microbiology, Q1.
 5. Carro-Huerga, G; Compant, S.; Gorfer, M.; **Cardoza, R. E.**; Schmoll, M.; Gutiérrez, S.; Casquero, P. A. (2020). Colonization of *Vitis vinifera* L. by the endophyte *Trichoderma* sp. strain T154: biocontrol activity against *Phaeoacremonium minimum*. *Front Plant Sci*. 2020 Aug. 11: 1-15. doi: 10.3389/fpls.2020.01170. ISSN 1664-462X. JCR: 5,753, Plant Sciences, Q1.
 6. Lindo, L.; McCormick, S. P.; **Cardoza, R. E.**; Busman, M.; Alexander, N. J.; Proctor, R. H.; Gutiérrez, S. (2019). Requirement of Two Acyltransferases for 4-O-Acylation during Biosynthesis of Harzianum A, an Antifungal Trichothecene Produced by *Trichoderma arundinaceum*. *J Agric Food Chem*. Jan. 67(2): 723-734. doi: 10.1021/acs.jafc.8b05564. ISSN 0021-8561. JCR: 4,192, Agriculture, Multidisciplinary, Q1.
 7. Proctor, R. H.; McCormick, S. P.; Kim, H-S.; **Cardoza, R. E.**; Stanley, A. M.; Lindo, L.; Kelly, A.; Brown, D. W.; Lee, T.; Vaughan, M. M.; Alexander, N. J.; Busman, M.; Gutiérrez, S. (2018). Evolution of structural diversity of trichothecenes, a family of toxins produced by plant pathogenic and entomopathogenic fungi. *PLoS Pathog*. Apr. 14(4):e1006946. doi: 10.1371/journal.ppat.1006946. ISSN 1553-7366. JCR: 6,463, Parasitology, Q1.
 8. Malmierca, M. G.; McCormick, S. P.; **Cardoza, R. E.**; Monte, E.; Alexander, N. J.; Gutiérrez, S. (2015). Trichodiene Production in a *Trichoderma harzianum erg1*-Silenced Strain Provides Evidence of the Importance of the Sterol Biosynthetic Pathway in Inducing Plant Defense-Related Gene Expression. *Mol Plant Microbe Interact*. Nov. 28(11):1181-1197. doi: 10.1094/MPMI-06-15-0127-R. ISSN 0894-0282. JCR: 4,145, Plant Sciences, Q1.
 9. **Cardoza, R. E.**; McCormick, S. P.; Malmierca, M. G.; Olivera, E. R.; Alexander, N. J.; Monte, E.; Gutiérrez, S. (2015). Effects of Trichothecene Production on the Plant Defense Response and Fungal Physiology: Overexpression of the *Trichoderma arundinaceum tri4* Gene in *T. harzianum*. *Appl Environ Microbiol*. Sep. 81(18):6355-6366. doi:10.1128/AEM.01626-15. ISSN 0099-2240. JCR: 3,823, Biotechnology and Applied Microbiology, Q1.
 10. Malmierca, M. G.; McCormick, S. P.; **Cardoza, R. E.**; Alexander, N. J.; Monte, E.; Gutiérrez, S. (2015). Production of trichodiene by *Trichoderma harzianum* alters the perception of this biocontrol strain by plants and antagonized fungi. *Environ Microbiol*. Aug. 17(8):2628-2646. doi: 10.1111/1462-2920.12506. ISSN 1462-2920. JCR: 5,932, Microbiology, Q1.

C.2. Research projects.

1. **PID2021-123874OB-I00** “Isolation of bacterial strains capable of de-epoxidating trichothecenes from bean and hops cultures colonized by *Trichoderma* strains producing these mycotoxins”. Financing Institution: State Investigative Agency-Ministry of Science and Innovation (Spain). PI: Santiago Gutiérrez Martín and Pedro A. Casquero Luelmo. University of León. 2022-2025. Role: Member of the research team.
2. **2019/00179/001** “Operative Group Quality Hops”. Financing Institution: Ministry of Agriculture, Fishing and Food (Spain). PI: Pedro A. Casquero Luelmo. University of León. 2019-2021. 30.428,75 €.

Role: Member of the research team.

3. **RTI2018-099600-B-I00** "Isolation of *Trichoderma* strains producing trichotecenes from bean crops and study of their effect on the defense of the plant against fungal diseases". Financing Institution: State Investigative Agency-Ministry of Science and Innovation (Spain). PI: Santiago Gutiérrez Martín. University of León. 2019-2021. 84.700 €. Role: Member of the research team.
4. **2019/00004/001** "Operative Group Spanish Quality Hops". Financing Institution: Ministry of Agriculture, Fishing and Food (Spain). PI: Pedro A. Casquero Luelmo. University of León. 2019-2021. 5.313,5 €. Role: Member of the research team.
5. **IDI-20160750** "Global approach to improve wine production against the climate change based on robotics, IR technology and on biotechnological and wine-yard handling strategies. Effect of *Xylotrechus arvicola* in the transmission of vine-wood diseases: use of *Trichoderma* in biological control of the insect and the disease". Financing Institution: Center for the Industrial-technological development (CDTI-Spain). University of León (Spain). 2016-2020. 197.593 €. Role: Member of the research team.
6. **AGL2015-70671-C2-2-R**. "Importance of *Trichoderma* membrane sterols in nitrogen use efficiency (NUE) of plants. Cloning of ergosterol and squalene receptor genes in tomato". Financing Institution: Ministry of Economy and Competitiveness (Spain). PI: Santiago Gutiérrez Martín. University of León. 2016-2018. 40.000,00 €. Role: Member of the research team.
7. **AGL2012-40041-C02-02**. "Farnesol as an autoregulatory molecule in *Trichoderma*. Tyrosol and farnesol signaling in *Trichoderma*-bean interaction". Financing Institution: Ministry of Economy and Competitiveness (Spain). PI: Santiago Gutiérrez Martín. University of León. 2013-2015. 65.000,00 €. Role: Member of the research team.

C3. 2013 – Today: Co-Director of 3 Ph.D. Thesis in this period in the University of León, one of them still in progress.

- **Dr. Mónica Gómez Malmierca** (2010-2013). "Biosynthesis of harzianum A and its role in physiology and biocontrol activity of *Trichoderma arundinaceum*". End date: April, 2013. Number of JCR Publications resulting from her Ph.D. work: 10. Current Position: Postdoctoral Fellow at the University of Oviedo 2014-2023 (Spain).

- **Dr. Laura Lindo Yugueros** (2016-2019). "Characterization of the effect of terpenes produced by *Trichoderma* in the interaction with plants and with phytopathogenic fungi". End date: November, 2019. Number of JCR Publications resulting from her Ph.D. work: 7. Current Position: Formulation Development Scientist at Chemo España SL. León (Spain).

- **Dña. Natalia Martínez Reyes** (currently in progress). "Study of the impact of secondary metabolites of *Trichoderma* on beneficial interactions with crops of agricultural interest in Castilla y León".

C.4. Participation in evaluation of scientific articles (SCI)

Since 2015 to date, I have reviewed **55** manuscripts for **32** SCI journals in different categories such as microbiology, mycology, plant sciences, biotechnology and genetics.