Brienza Monica

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EDUCATION

University of Basilicata (IT) in co-tutelle with **Université de Perpignan Via Domitia (FR)** — 2011-2014 (Awarded 12/03/2015)

- PhD in "BioEcosystems and BioTechnology
- Dissertation topic: **Solar Advanced Oxidation Processes for removing emerging contaminants in wastewater.**

University of Basilicata (IT) — Potenza, Italy 2011

- University Master's in "Theories and research methods in agro-environment"

University of Basilicata (IT) — Potenza, Italy 2009

- Bachelor in Forestry and Environmental Sciences

RESEARCH EXPERIENCE

University of Basilicata (02/08/2019-31/07/2022)

Research at fixed-term contract RTDA Projects "Technologies based on siliceous materials treated with sol-gel coating processes for water purification (TECOW)" and "Role of biofilms and the rhizosphere in the attenuation of pharmaceuticals and antibiotic resistance in irrigation whit wastewater" in collaboration whit INRAE G-EAU and HSM Montpellier.

University of Montpellier (01/11/2018-31/07/2019)

Post Doc MUSE Project "Rôle des biofilms et de la rhizosphère dans l'atténuation de l'occurrence de produits pharmaceutiques et de l'antibiorésistance lors de la réutilisation des eaux usées traitées en irrigation" in collaboration with Irstea G-EAU (Ait Mouheb Nassim), HSM Montpellier (Serge Chiron) and INRA LBE Narbonne (Nathalie Wery).

IRD – UMR HydroSciences Montpellier (02/11/2016 – 31/10/2018)

Post Doctorate

Risk assessment of contaminants in soil-crop systems, analytical chemistry, wastewater treatment and reuse.

Collaboration in"Assessing the fate of pesticides and water-borne contaminants in agricultural crops and their environmental risks-*AWARE*" and "Plateforme expérimentale de réutilisation d'eaux usées traitées en irrigation- AERMC" projects.

- The *AWARE* project aims to investigate the fate and potential reduction of pesticides and wastewater-borne contaminants in soil/plants from agricultural crops. Moreover, in the AWARE project we will evaluate environmental risks in agricultural fields due to the use of pesticides and the irrigation practices involving reused wastewater. Both pollution sources may have some inherent risks associated to food production. (http://www.waterjpi.eu/index.php?option=com_content&view=article&id=549:aware&catid=156:joint-calls).
- *AERMC* concerns the setting up an experimental platform to study the technical feasibility and evaluate the agronomic, sanitary and environmental impacts of a wastewater reuse for irrigation. The main objectives of this platform established in a Mediterranean context are (1) To fit

wastewater treatments to usage, (2) To optimize the efficiency and durability of irrigation systems, (3) To valorize TWW from an agronomic point of view, (4) To control risks related to environmental and sanitary issues.

Aristotle University of Thessaloniki (01/01/2016-31/08/2016)

Marie Curie Post Doctorate on **Project of European Union FP7-People-IAPP-WaSClean-612250** "Water and Soil Clean-up from Mixed Contaminants- WaSClean" project.

The *WaSClean* project aims to stimulate intersectoral collaboration to develop and scale-up comprehensive technology for the remediation of contaminated land from representative heavy metals (e.g. Pb, As, Cr, Cd, Hg), persistent organic pollutants (lindane, atrazine, obsolete pesticides), and synthetic dyes (reactive blue, red, black from textile industry).

The project covers developing novel Fe/Cu/carbon clean-up devices, as well as utilizing sulfate-reducing, sulphur-oxidizing and iron-and-sulphur-oxidizing bacteria as well as advanced oxidation techniques for treatment of contaminated land and waters (http://www.saske.sk/wasclean/).

My main topic was electrochemistry treatment for clean-up textile industrial wastewater and its reuse.

Plataforma Solar de Alméria, Spain (1/09/2015-24/10/2015)

Visiting Guest Research. Project "Solar photo-Fenton with persulfate at pilot scale for disinfection and for removal of emerging contaminants from domestic wastewater" funding by Solar Facilities for the European Research Area (*SFERA*) programme (http://sfera2.sollab.eu/).

During this short visiting, my research topic was deals with disinfection. It is a hot topic that concern Mediterranean countries, especially, countries where often the water has not good biologic and chemical status. In this project, the goal was to remove bacteria using removable energy such as solar light for drive photocatalytic treatment.

CNRS- HydroSciences Montpellier (15/11/2014-14/02/2015)

Ingeneer contract on "Diffusion of nanotechnology based devices for water treatment and recycling-NANOWAT "1-B/2.1/049, Grant No.7/1997)", with financial assistance of European Union under the ENPI-CBC-MED Programme (www.nanowat.eu). *NANOWAT* project focuses on the experimentation, development and diffusion in the Mediterranean area of new technologies for efficient water treatment based on natural and modified nano-materials, using either filtration and sedimentation or photo-degradation, or their combination. This object was achieve in collaboration with University of Basilicata - Department of Agriculture, Forestry and Environment (Italy); Centre National de la Recherche Scientifique, Hydrosciences Montpellier (France); Spanish National Research Council, Institute for Natural Resources and Agrobiology (Spain) and The Hebrew University of Jerusalem (Israel).

Valorisation of the research is under "**Déclaration of d'invention**".

University of Basilicata (IT) in co-tutelle with Université de Perpignan Via Domitia (FR) (01/11/2011-31/10/2014) (18 months in each Univeristy)

PhD Title: "Solar Advanced Oxidation Processes for removing emerging contaminants in wastewater". The objectives of the dissertation was to apply Solar Advanced Oxidation Processes (AOPs) for removing emerging contaminants in wastewater. Among all AOPs, the focus of this dissertation was to applied solar homogenous (photo-Fenton with peroxymonusulphate as oxidant agent) and heterogeneous (TiO_2 as semiconductor) photocatalysis. The first aims was to find the adapted condition for have the best performance of the processes, step necessary for move to simple cases to the complicate case that is the reality. The mains goal in this work was to compare these two technologies under different aspect: (i) degradation rate, (ii) transformation product, (iii) toxicity and estrogenic abatement. The relevant results are published in *four peer-review journal*.

My PhD Thesis was the scientific part of "Diffusion of nanotechnology based devices for water

treatment and recycling - *NANOWAT* (1-B/2.1/049, Grant No.7/1997)", with financial assistance of European Union under the ENPI-CBC-MED Programme.

Internship Leonardo da Vinci Fellowship at Mgarr Local Council, Malta (Mar 2009-June 2009)
Topic "Use of the cypress in the protection of rural economy, the environment and the Mediterranean landscape: prevention and management of natural risks". It was a scientific contribution to MedCypre project.

SKILLS and TECHNIQUES

- Emerging contaminants
- Analytical chemistry (HPLC/UV, LC-MS, etc.)
- Bioassays
- Disinfection (i.e. *Escherica coli*, *Enterococcus feacalis*)
- Environmental risk assessment of contaminants
- Advanced Oxidation Processes
- Wastewater treatment and reuse
- Toxicity (i.e. *Vibrio fischeri*, *Daphnia magna*)
- I have acted as **referee** for international journals including *Journal of Hazardous Materials, Chemical Engineering Journal, Water Research, Catalysis Today, Separation and Purification Technology*
- I have collaborated on **writing proposals** such as: (i) " Assessing the fate of pesticides and water born contaminants in agricultural crops and their environmental risks – **AWARE",** project funding by Water JPI (ref internet www;. (ii) **EranetMed2** with the following proposal "Energy efficient hybrid treatment units based on sulfate radicals coupled with simple membrane treatment systems for efficient waste water treatment and disinfection for reuse-**RadMem Tech**. Joins institutions was from EU and non EU countries: Greece, Italy, Germany, Turkey, Egypt and Jordan, (iii) **Marie Curie IF** grant in collaboration with Catalan Institute for Water Research (ICRA),(iv) **EranetMed2** with the following proposal "Monitoring and modelling-based approaches for a better environmental risk assessment of CECs in reclaimed wastewater for crop irrigation – **MORISKI**. Join institutions was from EU and non EU countries: France, Italy, Cyprus, Jordan, Tunisia.
- Languages:1) **Italian** (native)
  2) **English** fluent (riding, speaking, writing)
  3) **French** Intermediate (speaking), basic (reading, writing).

PUBLICATIONS

Chapter book

- Brienza M., Özkal C.B., Li Puma G. (2018) Photo(Catalytic) Oxidation Processes for the Removal of Natural Organic Matter and Contaminants of Emerging Concern from Water. In: The Handbook of Environmental Chemistry. Springer, Berlin, Heidelberg. doi.org/10.1007/698_2017_189
- Brienza M., Chiron S., Buitrago B. H., Manasfi R. (2020) Accumulation of PhACs in soil after irrigation with treated wastewater. In: The Handbook of Environmental Chemistry (698) Interaction and Fate of Pharmaceuticals in Soil-Crop Systems - The Impact of Reclaimed Wastewater. *In press*

Peer-reviewed journal articles

1. Manasfi, R., Chiron, S., Montemurro, N., Perez, S., Brienza, M. Biodegradation of fluoroquinolone antibiotics and climbazole fungicide by *Trichoderma species*. *Environ Sci Pollut Res* (2020) accepted 13th March 2020. https://doi.org/10.1007/s11356-020-08442-8

2. Brienza, M., Manasfi, R., Chiron, S. Relevance of N-nitrosation reactions for secondary amines in nitrate-rich wastewater under UV-C treatment. *Water Research* (2019) 162:22-29

3. Brienza, M., Nir,S., Plantard, G., Goetz, V., Chiron, S. Combining micelle-clay sorption to solar photo-Fenton processes for domestic wastewater treatment. *Environ Sci Pollut Res* (2018) *10.1007/s11356-018-2491-3*

4. Brienza, M., Chiron, S. Enantioselective reductive transformation of climbazole: A concept towards quantitative biodegradation assessment in anaerobic biological treatment processes. *Water Res.*116 (2017) 203-210

5. Brienza, M., Duwig, C., Pérez, S. and Chiron, S. 4-nitroso-sulfamethoxazole generation in soil under denitrifying conditions: Field observations versus laboratory results*. J. Hazard. Mater. 334* (2017) 185-192

6. Brienza, M., Katsoyiannis I.A. Sulfate radical technologies as tertiary treatment for the removal of emerging contaminates from wastewater. *Sustainability 9* (2017), 1-18

7. Kacem, M., Plantard, G., Brienza, M., and Goetz, V. Continuous-flow aqueous system for heterogeneous photocatalytic disinfection of gram-negative *Escherichia coli*. *Ind. Eng. Chem. Res. 56* (2017) 15001-15007

8. Brienza M., Mahdi Ahmed M., Escande A., Plantard G., Scrano L., Chiron S., Bufo, S. A. and Goetz V., "Use of solar advanced oxidation processes for wastewater treatment: follow-up on degradation products, acute toxicity, genotoxicity and estrogenicity", *Chemosphere*, 148 (2016) 473-480.

9. Lelario F., Brienza M., Scrano L., BufoS. A., "Effectiveness of different advanced oxidation processes (AOPs) on the abatement of the model compound mepanipyrim in water as determined using liquid chromatography coupled with electrospray ionization (LC/ESI) and Fourier-Transform Ion Cyclotron Resonance Mass Spectrometry (FTICR MS)", *Journal of Photochemistry and Photobiology A: Chemistry*, 321(2016) 187-201

10. Brienza M., Mahdi Ahmed M., Escande A., Plantard G., Scrano L., Chiron S., Bufo S. A. and Goetz V., "Relevance of a photo-Fenton like technology based on peroxymonosulphate for 17-beta-estradiol removal from wastewater", *Chemical Engineering Journal*, 257(2014)191–199.

11. Mahdi Ahmed M., Brienza M., Goetz V., Chiron S., "Solar photo-Fenton using peroxymonosulfate for organic micropollutants removal from domestic wastewater: Comparison with heterogeneous TiO_2 photocatalysis", *Chemosphere*, 117(2014) 256–261

Short Communications in National and International Conferences

1. Brienza Monica, Manasfi Rayana, Chiron Serge "N-nitrosation of amines is a sink for NO in soil: Impact on denitrification" Xenowac II, 10th – 12th October 2018, Limassol, Cyprus

2. Brienza Monica and Chiron Serge "*Enantioselective reductive transformation of climbazole: A concept towards quantitative biodegradation assessment in anaerobic biological treatment processes*" SETAC EUROPE, 7th-11th May 2017, Brussels

3. Chiron Serge, Brienza Monica, Nir Shlomo, Goetz Vincent, "*Combining micelle-clay sorption to solar photo-Fenton for domestic wastewater treatment and water reuse in irrigation".* VIII Encontro sobre Aplicações Ambientais de Processos Oxidativos Avançados and II Congresso Iberoamericano de Processos Oxidativos Avançados, November 3th-6th,2015, Belo Horizonte, Brazil (Oral Presentation)

4. Brienza M., Mahdi Ahmed M., Escande A., Plantard G., Scrano L., Chiron S., Bufo S.A. and Goetz V., "*Use of solar advanced oxidation processes for wastewater treatment: follow-up of degradation*

products, acute toxicity and estrogenicity". 3rd Water Research Conference, January 11th -14th , 2015, Shenzhen, China (Oral Presentation)

5. Mahdi Ahmed M., Brienza M., Goetz V., Chiron S. "*Solar photo-Fenton using peroxymonosulfate or persulfate for organic micropollutants removal from domestic wastewater: Comparison with heterogeneous TiO_2 photocatalysis"* 3rd Water Research Conference, January 11th -14th , 2015, Shenzhen, China (Oral Presentation)

6. Brienza M., Mahdi Ahmed M., Escande A., Plantard G., Scrano L., Chiron S., Bufo S.A. and Goetz V., "Effectiveness of AOPs processes for the removal of emerging contaminants from wastewater: the mepanipyrim case" 8th European Conference in Pesticides and Related Organic Micropollutants in the Environment. 14th Symposium on Chemistry and Fate of Modern Pesticides – Ioannina, Greece, September 18th - 21th, 2014, Volume: 1, 162-163.DOI:10.13140/2.1.3081.6009

7. Brienza M., L. Scrano, F. Lelario, T. Trabace, S.A. Bufo."*Effectiveness of AOPs processes on the removal of contaminants and their oxidation intermediates: the mepanipyrim case*". 248th ACS National Meeting & Exposition – San Francisco, August 10th-14th,2014 (Oral presentation N. 338)

8. Brienza M**.,** Mahdi Ahmed M., Escande A., Plantard G., Scrano L., Goetz V., Chiron S.and BufoS.A., *"Photocatalyse solaire pour l'elimination de contaminants emergents dans les eaux usées"* . Journées Nationales sur l'Énergie Solaire (JNES2014) – Perpignan, July 8th-10th 2014 (Oral presentation)

9. Brienza M., Mahdi Ahmed M., Escande A., Plantard G., Scrano L., Goetz V., Chiron S.and Bufo S.A., "*Solar photocatalysis as a final step for 17β-estradiol removal in domestic wastewater effluent".* Third European Conference on Environmental Applications of Advanced Oxidation Processes (EAAOP -3) – Almeria, October 27th-30th, 2013 (Oral presentation No. 60).

10. Brienza M**.,** Mahdi Ahmed M., Plantard G., Scrano L., Goetz V., Chiron S. and Bufo S.A.*"Evolution of toxicity in an effluent containing hormone, Estradiol, during mineralization processes by heterogeneous photocatalysis and photo-Fenton"*. In Book of Abstract 14th EuCheMS International Conference on Chemistry and the Environment (ICCE 2013) - Barcelona, June 25th -28th, 2013, p. 326 (Poster

11. Brienza M., Scrano L., Fraddosio Boccone L., Mancusi C., Lovallo M., Bove B., Bufo S.A. *"Agenti biodeteriogeni e beni colturali".* In: Book of Abstract XXVIII National Congress of the Italian Society of Agricultural Chemistry, Piacenza, Italy, September 20th -21th , 2010, p. 99.

12. Brienza M., Scrano L., Mancusi C., Lovallo M., Bove B., Bufo S.A*."Biomonitoring of atmospheric pollution using lichen bags in two Italian cities: Potenza and Matera".* In: Proceedings of 6th European Conference on Pesticides and Related Organic Micropollutants in the Environment, 12th Symposium on the Chemistry and Fate of Modern Pesticides, Matera Italy, 5-10 September 2010, pp. 183-185. ISBN 978-88-7522-098-3

13. Brienza M.,Scrano L., Mancusi C., Lovallo M., Bove B.,Bufo S.A.*"Biodeteriogenic agents and cultural heritage".* In: Book of Abstract 1stInternational Congress - Chemistry for cultural heritage (ChemCH) -Ravenna June 30th- July 3rd, 2010, p. 107 (Poster)