PhD Candidate Profile

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Research Group: **GMAPS - Grupo de pesquisa em metodologias analíticas e processos avançados**

Research Centre: **N/A**

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Funding body: **Fundação Parque Tecnológico Itaipu**

Area (field) of study: **Analytical Chemistry and Advanced Oxidation Process**

Thesis Title: **Monitoring of organic microcontaminants in different real samples of environmental relevance.**

Abstract:

Micro contaminant analysis such as pharmaceuticals and pesticides in environmental matrices has received lot of attention in recent years. Understanding the occurrence and transformation of these contaminants is fundamental in order to propose effective treatment methods to eliminate them. Therefore, this study has two research lines: i) identify pharmaceuticals and their transformation products in raw hospital wastewater through different strategies using high resolution mass spectrometry and a homemade database of pharmaceuticals and their transformation products that usually do not have analytical standards. In this context, a simple, fast and cheap extraction / preconcentration method is proposed for TPs analysis during drug degradation by Photo Fenton Solar processes. ii) In addition to drugs, pesticides are widely used in Brazil and worldwide. Currently, many quantitative methods are reported, but the use of a database for screening analysis of a wide range of pesticides simultaneously, using high resolution mass spectrometry, is still not widespread. Thus, the construction of a large database

containing permitted and banned compounds in Brazil and around the world was built for the assessment of surface water contamination in the western region of Paraná state and also in the northwestern of Rio Grande do Sul state. In addition, studies on the prediction of the toxicity, biodegradability and mutagenicity of these contaminants were performed using free software to better understand the risk assessment of the compounds found in different environmental matrices.

Collaborations:

- Prof. Dr. Renato Zanella - Universidade Federal de Santa Maria (UFSM);
- Prof. Dr. Felix Hernández - University Jaume I

Publications:

- BECKER, RAQUEL WIELENS; IBÁÑEZ, MARIA; LUMBAQUE, ELISABETH CUERVO; WILDE, MARCELO LUÍS; DA ROSA, TAINÁ FLORES; HERNÁNDEZ, FÉLIX; SIRTORI, CARLA. Investigation of pharmaceuticals and their metabolites in Brazilian hospital wastewater by LC-QTOF MS screening combined with a preliminary exposure and in silico risk assessment. SCIENCE OF THE TOTAL ENVIRONMENT, v.699, p.134218, 2019.
- DELLA-FLORA, A.; WIELENS BECKER, R.; FREDERIGI BENASSI, S.; THEODORO TOCI, A.; CORDEIRO, G.A.; IBÁÑEZ, M.; PORTOLÉS, T.; HERNÁNDEZ, F.; BOROSKI, M.; SIRTORI, C. Comprehensive investigation of pesticides in Brazilian surface water by high resolution mass spectrometry screening and gas chromatography-mass spectrometry quantitative analysis. SCIENCE OF THE TOTAL ENVIRONMENT, v.669, p.248 - 257, 2019.
- CUERVO LUMBAQUE, ELISABETH; WIELENS BECKER, RAQUEL; SALMORIA ARAÚJO, DÉBORA; DALLEGRAVE, Alexsandro; OST FRACARI, TIAGO; LAVAYEN, VLADIMIR; SIRTORI, CARLA. Degradation of pharmaceuticals in different water matrices by a solar homo/heterogeneous photo-Fenton process over modified alginate spheres. Environmental Science and Pollution Research, v.26, p.6532 - 6544, 2019.
- DELLA-FLORA, ALEXANDRE; BECKER, RAQUEL W.; FERRÃO, MARCO F.; TOCI, ALINE T.; CORDEIRO, GILCÉLIA A.; BOROSKI, MARCELA; SIRTORI, CARLA. Fast, cheap and easy routine quantification method for atrazine and its transformation products in water matrixes using a DLLME-GC/MS method. Analytical Methods, v.10, p.5447 - 5452, 2018.

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Presentations:

LUMBAQUE, E. C.; BECKER, R. W.; ARAUJO, D. S.; DALLEGRAVE, A.; LAVAYEN, V.; SIRTORI, C. Iron alginate beads for efficient pharmaceutical removal using heterogeneous solar photo-Fenton like process. In: 10th European meeting on Solar Chemistry and Photocatalysis: Environmental Applications (SPEA10) , 2018, Almeria.

SIRTORI, C.; LUMBAQUE, E. C.; ARAUJO, D. S.; BECKER, R. W.; HERNANDEZ, F. Screening of pharmaceuticals, with special emphasis in metabolites, in hospital wastewater using LC-QTOF MS. In: 40th International Conference on Environmental & Food Monitoring (ISEAC-40), 2018, Santiago de Compostela.

BECKER, R. W.; MARSON, E.; SOUSA, R.; SIRTORI, C.; TROVO, A. G. Chloramphenicol degradation and transformation products elucidation by UHPLC-QTOF-MS. In: 7th Brazilian Conference on Mass Spectrometry, 2018, Rio de Janeiro.

DALLA-FLORA, A.; TOCI, A. T.; CORDEIRO, G. A.; BOROSKI, M.; BECKER, R. W.; FERRÃO, M. F.; SIRTORI, C. DEVELOPMENT OF A ROUTINE QUANTIFICATION METHOD FOR ATRAZINE AND THEIR TRANSFORMATION PRODUCTS USING DISPERSIVE LIQUID–LIQUID MICROEXTRACTION COUPLED WITH GC–MS In: 7thBrazilian Conference on Mass Spectrometry, 2018, Rio de Janeiro.

SIRTORI, C.; DALLA-FLORA, A.; BECKER, R. W.; TOCI, A. T.; BOROSKI, M.; BENASSI, S. F.; CORDEIRO, G. A.; IBANEZ, M.; HERNANDEZ, F. Investigation of pesticides in surface water from Brazil by combined use of UHPLC-QTOF MS screening and DLLME/GC-MS quantitative analysis In: 40th International Conference on Environmental & Food Monitoring (ISEAC-40), 2018, Santiago de Compostela.