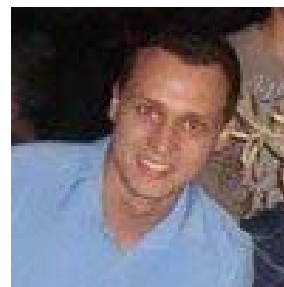


PhD Candidate Profile

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Research Group:

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Funding body:

CNPq and CAPES - Brasil

Area (field) of study:

Removal of antimicrobials and antimicrobials resistance by advanced oxidation processes

Thesis Title:

Degradation of Gatifloxacin by advanced oxidative processes

Abstract:

Gatifloxacin (GAT), an antimicrobial belonging to the fluoroquinolone family, has activity against Gram-positive and Gram-negative bacteria and is used for the control of infections in both humans and veterinary medicine. The presence of this antimicrobial has already been reported in environmental matrices ($\mu\text{g L}^{-1}$), which has generated concern about the possibility of developing resistant bacteria. This study investigates the degradation of gatifloxacin ($500 \mu\text{g L}^{-1}$) by physical processes (photolysis-UVC_{254nm}), chemical (peroxidation-initial $\text{C}_{\text{H}_2\text{O}_2} = 0.4$ to 2.4 mmol L^{-1}) and by advanced oxidative processes (POA) (UVC_{254nm} / H_2O_2 , ozonization (pH 3, 7, 10 and 11, dose = $8.4\text{-}168 \text{ mg L}^{-1} \text{ O}_3$) and heterogeneous photocatalysis (UVC / TiO_2 and UVA / TiO_2). The ability of the hydroxyl radicals formed to degrade the drug and to evaluate the reduction of the residual antimicrobial activity using *E.coli* and *B. subtilis* bacteria as test organism were evaluated. Acute toxicity assays were performed with the evaluation of inhibition of bioluminescence for *Vibrio fischeri*, and the degradation products were proposed based on mass spectrometry.

Collaborations:

Dr. Caio A A Rodrigues da Silva

Dr. José Roberto Guimarães

Publications:

Caianelo M, Rodrigues-Silva C, Maniero MG, Guimarães JR (2016) Antimicrobial activity against Gram-positive and Gram-negative bacteria during gatifloxacin degradation by hydroxyl radicals. *Environ Sci Pollut Res int.* 2017 Mar;24(7):6288-6298.

Presentations:

CAIANELO, MARLON; RODRIGUES-SILVA, C; MANIERO, MILENA GUEDES; José R. Guimarães TiO₂ Anatase Applied in the Photocatalytic Oxadation of Gatifloxacin In: SPACEC-21 - The 21st International Conference on Semiconductor Photocatalysis & SolarEnergy Conversion, 2016, Atlanta.

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Rodrigues-Silva, C., Caianelo, M., Venancio, W. A. L., Guimarães, J. R. Photocatalytic Oxidation of Tetracyclines at Environmental Concentration Levels: Evaluation of Drugs Residual Biological Activity. SPACEC-21 - The 21st International Conference on Semiconductor Photocatalysis & SolarEnergy Conversion, 2016, Atlanta.