EMERGING CONTAMINANTS IN WASTEWATER RECLAMATION PLANT

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Abstract

This study is determining the removal efficiency of caffeine, atrazine, bisphenol-A, estrone, estriol, 17 β -etinyloestradiol, 17-estradiol and triclosan in Wastewater Reclamation Plant Capivari II (EPAR Campinas) that employs Membrane Bio Reactor with ultrafiltration membranes after a biological treatment. The result is being compared with other four WWTP, Capivari I, Samambaia, Piçarrão and Anhumas, all of them located in the same city.

Key words:

Emerging Contaminants, Caffeine, Membrane Bio Reactor.

Introduction

The wastewater reclamation plant (WWRP) Capivari II is located in the Midwestern region of the city of Campinas-SP and receives domestic sewage from about 175,000 inhabitants. The WWRP employs a biological treatment followed by Membrane Bio Reactor (MBR) system with ultrafiltration membranes. The primary aims of this study was to determine the concentration of these contaminants in raw sewage, pre-MBR system effluent and the final effluent for obtained the removal efficiency of this compound in WWRP by monthly sampling held between March 2015 and February 2016 in order to complete a seasonal period. After this period, another campaign of sampling was started with the comparison of the removal efficiency in WWRP with other conventional wastewater treatment plants (WWTP) located in the same city, now sampling in raw sewage and the final effluent.

Results and Discussion

Image 1. Summary scheme of the experimental part.

The hormones E1, E2 and EE2 was detected below LOD (2 ng L⁻¹) for any WWTP. The LOD for CAF, ATZ, BPA and TCS was 2 ng L⁻¹ and 3 ng L⁻¹ for E3.

The matrix effect may have been a problem in the determination of the compounds studied, causing some to appear in the final effluent, but not to appear in influent samples.

Removal of caffeine

Image 2. Comparison of caffeine removal of five WWTP

Image 3. Mean of results for ATZ, E3, BPA and TCS

Conclusions

The study has indicated that caffeine removal efficiency in the treatment employed in WWRP Capivari II is above 99.99 %. For other compounds investigated, the frequency of detection is low for indicate the removal of them. More samples are being collected in this study. Comparing the WWTP, the WWRP (EPAR) Capivari II have been shown the highest removal of caffeine.

Acknowledgement

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