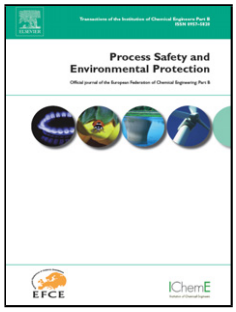

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Triclosan, carbamazepine and caffeine removal by activated sludge system focusing on membrane bioreactor

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Highlights

- High Triclosan concentration inhibits the nitrification in biological processes
- Triclosan deteriorates biomass characteristics increasing irreversible fouling
- MBR is a suitable technology for triclosan and caffeine removal

Abstract

Alternative processes need to be designed for the treatment of industrial effluents containing pharmaceutical and personal care products to improve their quality, permit the reuse of water for industrial applications and meet the standards set by environmental regulations prior to discharge. This type of effluent is a major source of water pollution since conventional activated sludge-based treatments are not effective in removing micropollutants.

Carbamazepine, caffeine and triclosan are important trace contaminants commonly found in wastewater treatment plants, and were selected as target compounds to be treated in a cyclic anoxic/aerobic membrane bioreactor. This study aims to evaluate the biomass' characteristics and activity, and its influence over membrane fouling when treating the aforementioned compounds. Caffeine is known to be partially biodegraded whereas triclosan can inhibit microorganism's activity. In order to evaluate this effect, complimentary batch experiments were set up to determine whether triclosan might inhibit nitrification.

Low ammonia removal efficiencies were observed in both experimental systems, therefore suggesting that nitrification was being inhibited probably due to the presence of triclosan. The ultrafiltration