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Enhancement with physicochemical and biological treatments in the removal of pharmaceutically active compounds during sewage sludge anaerobic digestion processes

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ABSTRACT

The removal of 4 typical pharmaceutically active compounds (PhACs), i.e. clofibrac acid (CFA), triclosan (TCS), carbamazepine (CBZ) and diclofenac (DCF) in sewage sludge was investigated during anaerobic digestions (ADs) under mesophilic and thermophilic conditions. The performances of ADs were enhanced with ultrasonic, mechanical rotary disc or enzymatic treatments. Ultrasonic pre-treatment could enhance the performances on the removal of PhACs better than ultrasonic post-treatment. CFA, TCS, CBZ, and DCF were finally reduced by 73%, 76%, 73%, and 64%, respectively, during thermophilic AD (TAD) combined with ultrasonic pre-treatment for 30 min at sound energy density 0.05 W/mL at SRT 15 d. For ADs combined with rotary disc pre-treatment or post-treatment, the removal of PhACs

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