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Ultrahigh pressure liquid chromatography as a separation technique for the simultaneous extraction and determination of four different groups of pharmaceuticals in compost

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Extracting and separating pharmaceuticals from complex environmental matrices such as compost is particularly challenging because of the complex nature of the samples, the different chemical characteristics of the compounds and the low detection limits required. In this study, ultrahigh pressure liquid chromatography (UHPLC) was used as a separation technique for the simultaneous extraction and determination of 4 different groups of pharmaceuticals in compost obtained from the thermophilic aerobic treatment of placenta. The pharmaceuticals were 2 non-steroidal anti-inflammatory drugs, ketorolac and naproxen, usually administered to humans; two fluoroquinolones- ofloxacin and ciprofloxacin (which are among the most commonly prescribed class of antibiotics in Mexico); 2 anti-cancer (antineoplastic or cytotoxic) chemotherapy drugs- ifosfamide and cyclophosphamide and 2 β-blockers-atenolol and propranolol, also called β-adrenergic blocking agents, which treat a variety of conditions, such as high blood pressure, glaucoma and migraines. The pharmaceuticals of each group were selected because they are commonly used in Mexico and environmental and health impacts have been reported. The clustering was based on the use of the drug and not on the similarity of the structure. The use of UHPLC allowed better detection and quantification of all pharmaceuticals; furthermore, shorter analysis time was required and lower costs were involved. Recovery values of the ultrasonic extraction for all compounds were on the range of 87% and 113%. The limits of detection and quantification for the eight pharmaceuticals were on the order of 0.66 ng g^{-1} and 2 ng g^{-1} respectively for all the pharmaceuticals analyzed. These values are lower than those values reported in the literature.

Biography

Miguel Angel Lopez Zavala has completed his PhD and Post-doctoral studies at the Hokkaido University, Japan, in the field of Urban and Environmental Engineering. He is the Professor at the Tecnologico de Monterrey, Mexico. He is a Member and Evaluator of the National Research System of the National Council of Science and Technology. He was a Researcher of the Japan Science and Technology Agency at Hokkaido University, Japan. He is the author of more than 55 scientific papers published in international journals and proceedings of international conferences and congresses. He is an active Member of the International Water Association and a Treasurer of la IWA-Mexico from 2010 to 2011.

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