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A simple analytical method for the detection and quantification of a pharmaceuticals and pesticides in complex environmental matrices

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During the last years, the use of sewage sludge as soil amendments for crops has gain in interest. It limits the addition of fertilizers, it reduces the land occupation and it promotes waste valorization. However, the presence of organic compounds such as pharmaceuticals and pesticides (PhPCs) may cause the transfer of these contaminants to the soil and to the groundwaters. In this work, an analytical method for the simultaneous extraction of 70 compounds from complex matrices was developed and validated using an experimental design plan. Firstly, the targeted compounds were extracted by an optimized QuEChERS approach using ethyl acetate/water (4/1, v/v) as the extraction solvent and a dispersive solid phase extraction (dSPE) with C18/Na₂SO₄. Then, the analytes were quantified using a LC-MS/MS methodology. The method was validated in terms of accuracy and precision. The results obtained showed a strong matrix effect resulting by signal suppression. Therefore, the solvent matched calibration approach was chosen for the quantification. The applicability of the method for different matrices was demonstrated through the analysis of biosolids samples from Magog (Qc) waste water treatment plant, sediment samples from Massawippi (Qc) and Montjoie (Qc) Lakes and benthic organisms (chironomidae and oligochaete). The recoveries were higher than 50% for most of the targeted compounds in all tested matrices. 10 compounds (acetaminophen, caffeine, carbendazim, naproxen, carbamazepine, atrazine, ibuprofen, fenofibrate and ketoprofen metolachlor) were quantified in the samples at concentration ranging from ≈ 5 ng.g⁻¹ to ≈ 40 ng.g⁻¹.

Biography

Sabrina Saibi is PhD student at université de Sherbrooke. She is working on the development of analytical methodology and samples preparations for the detection and quantification of contaminants of emerging concern (CEC) in complexes matrices (biological, environmental). She also works on the monitoring and occurrence of the CEC in the environment. She also focuses on the development and implementation of new biotechnologies process for the removal of organic contaminants (fungi, bacteria, enzyme catalysis).

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