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Analytical methods for the determination of emerging contaminants in sewage sludge samples. A review

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ABSTRACT

Emerging contaminants are a heterogeneous group of chemicals that includes daily personal care products and pharmaceuticals (PPCPs), flame retardants, endocrine disrupting chemicals (EDCs) and nanoparticles (NPs). The present work is an overview focused in the research published in the scientific literature for the determination of this type of pollutants in sewage sludge samples in the last 5 years. Instrumental and sample preparation methods for the detection and quantification of the analytes of interest are reviewed, with an emphasis on the sample treatment techniques. Liquid chromatography (LC) and gas chromatography (GC) coupled to mass spectrometry are generally employed as the analytical technique of preference. Sample preparation techniques include conventional methods such as Soxhlet, solid-phase extraction (SPE), pressurized liquid extraction (PLE) or ultrasound-assisted extraction (UAE), but also other recent techniques, including novel microextraction techniques such as microextraction by packed sorbent (MEPS) or solid-phase microextraction (SPME).

[1] These authors contributed equally to this work.