

Monitoring of 53 Contaminants of Emerging Concern: Occurrence in Effluents, Sludges, and Surface Waters Upstream and Downstream of 7 Wastewater Treatment Plants

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Abstract : Seven French wastewater treatment plants (WWTP) were monitored for 53 contaminants of emerging concern within a nation-wide monitoring campaign in surface waters, which took place in 2018. The overall objective of the 2018 campaign was to provide the exercise of prioritization of emerging substances, which is being carried out in 2021, with monitoring data. This exercise should make it possible to update the list of relevant substances to be monitored (SPAS) as part of future water framework directive monitoring programmes, which will be implemented in the next water body management cycle (2022). One sampling campaign was performed in October 2018 in the seven WWTP, where affluent and sludge samples were collected. Surface water samples were collected in September 2018 at three to five sites upstream and downstream the point of effluent discharge of each WWTP. The contaminants (36 biocides and 17 surfactants, selected by the Prioritization Experts Committee) were determined in the seven WWTP effluent and sludge samples and in surface water samples by liquid or gas chromatography coupled with tandem mass spectrometry, depending on the contaminant. Nine surfactants and three biocides were quantified at least in one WWTP effluent sample. Linear alkylbenzene sulfonic acids (LAS) and fipronil were quantified in all samples; the LAS were quantified at the highest median concentrations. Twelve surfactants and 13 biocides were quantified in at least one sludge sample. The LAS and didecyldimethylammonium were quantified in all samples and at the highest median concentrations. Higher concentration levels of the substances quantified in WWTP effluent samples were observed in the surface water samples collected downstream the effluents discharge points, compared with the samples collected upstream, suggesting a contribution of the WWTP effluents in the contamination of surface waters.

Keywords : contaminants of emerging concern, effluent, monitoring, river water, sludge

Conference Title : ICECW 2021 : International Conference on Emerging Contaminants in Wastewaters

Conference Location : Madrid, Spain

Conference Dates : March 25-26, 2021