

Domestic micropollutants, a diffuse industrial pollution – Part 1: from greywater to receiving water

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According to the USEPA, nonpoint source pollution (NPS) generally results from land runoff, precipitation, atmospheric deposition, drainage... NPS pollution, unlike pollution from industrial and sewage treatment plants, comes from many sources. Besides, non-point sources of pollution are often termed 'diffuse' pollution and are often associated with particular land uses, as opposed to individual point source discharges. However, such a definition is a general one. Another way to consider the spread of diffuse pollution is to consider the use of human-made products. Indeed, exposure to micropollutants (MPs) is mainly due to the use of marketed products since more than 10,000 organic chemicals such as pharmaceuticals, ingredients of personal care products and biocides are ubiquitously used in everyday life (Wick 2010). Companies which manufacture, import or sell those marketed products contribute to the MP dissemination.

As a consequence this study was conducted according to complementary approaches at the scale of the Paris conurbation. The main idea was to determine the MP sources: do they originate from domestic or industrial sources or both? To provide answers, the study followed two stages. The first one consisted in the comparison between the industrial and domestic discharges of alkylphenols (APs) and phthalates (PAEs) to the sewer network (Bergé et al. 2014). A total of 45 domestic samples as well as 101 industrial samples were collected from different sites, including 14 residential and 33 industrial facilities. The main findings of these early works were of prime interest for organizations in charge of the monitoring of industrial discharges. It has been highlighted that APs and PAEs are not rejected by the industry but originate from domestic wastewater: less than 5% of the load derived from industrial wastewater (Bergé et al., 2014). Hence, reducing industrial releases is not sufficient to decrease the AP and PAE loads to wastewater in urban areas. Therefore, the second stage focused on domestic wastewater and was enlarge to personal care products (namely parabens and triclosan), especially on greywater. The knowledge of the greywater contamination is needed for establishing a better management of the contamination at source. Greywater studied were those collected from showers, bathroom sinks, manual dishwashing, dishwashers, washing machines, and floor cleaning. A specific sampling procedure has been developed to collect each type of greywater separately (Deshayes 2015). About 25 samples for each type of greywater were collected.

For all the studied contaminants (alkylphenols, phthalates, parabens and triclosan), their ubiquity has been demonstrated since they were found in all the different type of greywater (Zedek et al. 2016; Deshayes et al., 2015). Moreover, significant variability in concentrations within each type of greywater and between different types of greywater was observed. This variability was explained by the consumption practices. This latter finding indicates the need to link environmental sciences with social sciences as carried out within the frame of the Cosmet'eau project in order to reduce MP discharges to receiving waters.

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