

*Abstract*

# Assessment of UV Filters and Parabens in a Small Portuguese Peri-Urban Catchment <sup>†</sup>

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**Abstract:** Increasing population and expansion of urban areas are often associated with degradation of aquatic ecosystems. Although water quality is a major concern for worldwide authorities, several emerging contaminants can threaten long term status of aquatic ecosystems and human health. UV filters are widely used in industrial products such as plastics, paints and coatings, to enhance their photo protective properties. Personal care products, such as shampoos, body creams, make-up and sunscreens, used in humans' daily routine, also comprise a wide variety of chemicals, such as organic UV filters and parabens. Some UV filters are persistent, bioaccumulative and toxic. Parabens prevent bacterial growth and extend products shelf-lives, but they can have endocrine disruption properties. Wastewater is a potential vehicle of UV filters and parabens to the aquatic ecosystems, where they tend to accumulate in suspended sediments. This study investigates the presence of organic UV filters and parabens in Ribeira dos Covões peri-urban catchment, in central mainland Portugal. The catchment has been deeply urbanized over the last decades, due to its proximity to Coimbra city center. Urban areas cover 40% of the catchment land-use and include several health services, such as a hospital, and a relatively large pharmaceutical company. Wastewater is piped and transported into a treatment plant (WWTP) located outside the catchment. The sewer system, however, is sometimes subject to failure, leading to leakages which affect local streams. In September 2018, fluvial sediment samples (0–3 cm depth) were collected in 10 sites across Ribeira dos Covões stream network. The freeze-dried sediment samples were extracted using an accelerated solvent extractor (ASE-350, DIONEX, Germany) method, and analysed for 17 UV filters, 5 parabens and 2 synthetic musks, using an Agilent UHPLC-MS/MS system operating with dopant-assisted atmospheric pressure photoionization (DA-APPI). The results show the presence of methylparaben (10.3 ng/g dw) at the catchment outlet. UV filters were found in sediments from several sites in Ribeira dos Covões. Compounds revealing highest concentrations were octocrylene, quantified in 8 of the 10 sampling sites and reaching 286.3 ng/g dw, and ethylhexyltriiazone, quantified in half of the monitored sites in concentrations up to 67.7 ng/g dw. The largest number of compounds and with highest concentrations, were recorded in two stream sections that received wastewater, based on reports from local citizens about sewer pipe leakages. Wastewater contamination can represent a major problem for the good status of aquatic ecosystems in urban environments.

**Keywords:** UV filters; parabens; sediments; peri-urban catchment

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