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National screening on selected organic compounds in groundwater

In 2011, the French Ministry of Ecology and the Water and Aquatic Environment National Office have implemented a national reconnaissance effort targeting “emerging” organic contaminants with various potential uses and origins. This study presents this national screening and fully discusses the occurrence of selected organic compounds (OCs) in groundwater. 411 OCs, including parents and transformation products (TPs), were targeted because they were not or poorly monitored in French groundwater. Ninety-one of the selected OCs are referenced as hazard molecules (WFD). They were collected in groundwater on 494 sites (springs, wells and boreholes) across France during two national sampling campaigns in spring and fall 2011. Amongst all sites, 282 are directly used (untreated) to provide drinking water. Groundwater samples were analysed in two French routine laboratories that are currently in charge of the regulatory monitoring. Amongst the 411 monitored substances, 180 were detected in at least one sampling point with values greater than the minimum reporting level, representing 44% of monitored compounds. Sixty substances were pharmaceutical products, 63 industrials products, 43 pesticides and 14 other emerging contaminants. Fifty-five compounds are found in more than 1% of collected samples. Although these products, industrial compounds constitute the most detected group with 23 compounds detected compared to 13, 14 and 5 pharmaceuticals products, pesticides and others emerging contaminants respectively. The 3 most frequently detected compounds are 1,2,3,4,6,7,8-H7CDD (61%, dioxin), deisopropyl-desethyl-atrazine (41.4%, forbidden herbicide metabolite) and caffeine (39.8%, life style product). The risk assessment associated with the occurrence of these substances will be fully discussed. Ultimately, these results should help the water resource managers and environmental regulators to develop sound policies regarding the occurrence and distribution of “emerging” organic contaminants in groundwater.

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