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Use of innovative technology for analysis of 54 VOCs in water: ITEX solution

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Abstract for a poster presentation

Topic : Environmental & analytical chemistry - B04 - Environmental fate and bioaccumulation of organic pollutants in aquatic systems

Key words : waste water, groundwater, VOCs analysis, degradation processes

Proposed chairs:

Contamination of aquifers by one or more volatile organic compounds (VOCs) is a national issue of potential concern because of the widespread and long-term use of many of these compounds. Many (VOCs) are toxic and some are considered to be carcinogenic, mutagenic, and teratogenic. Contamination also depends on the locations and types of VOC sources, the relative locations of wells, and the transport and fate of VOCs. The occurrence of low-level contamination of one or more VOCs in an aquifer also can provide managers with an early indication of the presence of VOCs that eventually might adversely affect the quality of water. Considering the high variability of VOCs concentration in groundwater especially in the case of industrial impacted groundwater, VOCs analysis is an important and sensitive point for understanding behaviour, attenuation or determining sources of the pollution.

Rapid sensitive and robust analysis of 54 VOCs including, BTEX and chlorinated solvents was developed using In Tube Extraction (ITEX) combined with GCMS for analysis in groundwater, effluent and surface waters. The study presents optimization of the method, validation on several matrices (occurrence of suspended matter, organic matter content). Validations, considering potential trap needle saturation process and matrix effects were undertaken, highlighting robustness of the ITEX technology.

Detection limits ranged from 0.25 µg/L to 2 µg/L were validated with recoveries ranged from 85% to 103% depending on the studied compounds. Applications for the monitoring of VOCs in polluted areas will be presented showing the efficiency and accuracy of ITEX use and the obtaining of robust data concerning degradation of VOCs and natural attenuation for some of them.