IDEN2REMOVE: Identification and Removal of Site-Specific Organic Pollutants to Preserve the Quality of Water Resources

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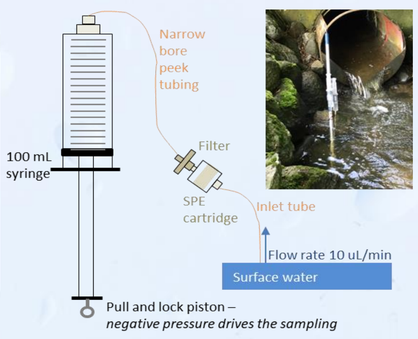
The challenge

Organic micropollutants are responsible for water quality impairment. These substances are present in water as complex and highly-diverse mixtures. The composition of organic micropollutant mixture depends on the pollution sources, the water treatments applied, and the water characteristics per se. Thus, pollutant mixtures are specific to each type of water and geographical and temporal context. In this sense, IDEN2REMOVE aims at providing tools to identify the site-specific priority organic pollutants in the different stages of the urban water cycle, so that preventive and corrective measures can be applied to minimize or avoid exposure to these chemicals.

Objectives

To optimize a low-cost, low-tech and energy-independent device to collect time-integrated samples throughout 3, 7 and 15 day-periods.



To optimize analytical methods based on high-resolution mass spectrometry to characterize organic contaminant mixtures

To develop an effective tool and workflow to identify site-specific priority pollutants (SSPPs) in each stage of the urban water cycle

To explore the efficiency of currently used advanced treatments to remove SSPPs

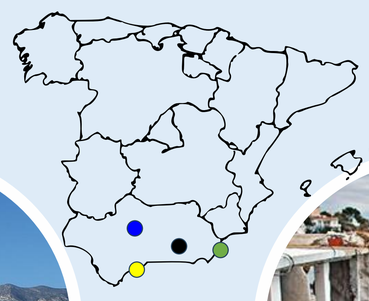
To involve and inform stakeholders and elaborate final recommendations for SSPPs management in water.

Methodology

SAMPLING: 4 circular water economy laboratories

DWTP serves 300k inhabitants
Source water: Reservoirs/ groundwater
Chlorine disinfection

DWTP serves 328k inhabitants
Source water: Reservoirs
Chloramine disinfection



DWTP serves 150-500k inhabitants
Source water: Reservoirs /desalinated wáter
Chlorine disinfection
Golf course irrigation with regenerated water

DWTP serves 150k inhabitants
Source wter: Desalinated water
Chlorine disinfection
Golf course irrigation with regenerated water

IDEN2REMOVE

IDENTIFICATION OF SITE-SPECIFIC PRIORITY POLLUTANTS

Non-target HRMS analysis

Chemometrics

Prioritization - occurrence and PBT (Persitency, Bioaccumulative and Toxic) properties

REMOVAL ASSESSMENT with currently used advanced treatments (LAB-SCALE)

Membranes

Activated carbon

AOPs (UV, H_2O_2 Ozone)

Water potabilization

Water regeneration

Outcomes

- A low-cost and low-tech device to collect time-integrated samples throughout 1, 3 or 7 day-periods.
- A high-resolution mass spectrometry method to capture the organic chemical fingerprint of water, including the most polar fraction
- A prioritization index based on the presence and the hazard (persistence, bioaccumulation potential and toxicity) of each chemical.
- Strategies to prevent and mitigate the exposure to site-specific priority organic micropollutants in the different stages of the water cycle.
- A sound scientific and technological knowledge and recommendations to manage organic micropollutants in the urban water cycle

Contact us

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In collaboration with:

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