
FRAME: A novel FRamework to Assess and Manage contaminants of Emerging concern in indirect potable reuse



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Emerging contaminants (e.g., pharmaceuticals, household chemicals), pathogens and antibiotic-resistant bacteria/genes are either continuously discharged by WWTPs into European rivers and streams or they are transferred to soils and groundwater by irrigation and groundwater recharge. Although impacts on aquatic and soil organisms have not been comprehensively elucidated so far, potential adverse effects on human health cannot be excluded if surface water or groundwater serves as a resource to augment downstream drinking water supply.

The aim of FRAME is to develop an overall evaluation procedure enabling a comprehensive assessment of efficient and cost-effective indirect potable reuse (INPR) measures to minimize the risks associated with emerging chemicals and microbial contaminants, while closing local and regional water cycles. This innovative framework goes well beyond traditional singular assessment strategies by providing an integrated tiered approach.

This approach encompasses:

- i) the removal efficiencies of water reclamation processes for suitable and representative (indicator) contaminants, including the formation of undesired transformation products,
- ii) the inactivation of microbial contaminants,
- iii) the removal of antibiotic-resistant bacteria/genes,
- iv) the minimization of ecotoxicological and human health risks, as well as
- v) costs and non-monetary benefits and drawbacks of selected INPR strategies.

For a comprehensive process evaluation, sound monitoring procedures at representative field sites practicing INPR, sensitive and accurate water quality characterization methods, reliable modelling approaches, and appropriate (eco)toxicological assessment strategies will be developed and validated.

The outcomes of this study will be embedded into a decision framework that can assist stakeholders and policy makers in selecting appropriate and cost-effective INPR applications, while minimizing ecological and human health risks.

