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## MOTREM: Integrated processes for MOonitoring and TRreatment of EMerging contaminants for water reuse

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Javier Marugán



### Project Coordinator:

- Javier Marugán, Universidad Rey Juan Carlos (URJC), Spain

### Projects partners:

- Bertram Kuch, Universität Stuttgart (UST), Germany

- Jukka Pellinen, University of Helsinki (UH), Finland

- Paola Calza, Università di Torino (UNITO), Italy

- Frank Rogalla, FCC Aqualia S.A. (AQUALIA), Spain

- Pedro Cano, Bruker Española, S.A. (BRUKER), Spain

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The MOTREM project focuses on the development of integrated processes for monitoring and treatment of emerging contaminants (ECs), improving the efficiency of the removal of these pollutants in urban wastewater treatment plants (WWTPs), especially for water reuse.

The project aims to provide new technologies for water treatment and/or improving the existing ones through the development of integrated processes for monitoring and treatment of ECs in the current waterline of municipal wastewater treatment plants, especially focusing on the aspect of water reuse. For this goal, the project combines cross- and multi-disciplinary expertise on water treatment processes design and engineering, analytical chemistry and ecotoxicology applied to ECs that guarantee the generation not only on new scientific knowledge but also of innovative commercial solutions to the market.

The general ideas behind MOTREM project are:

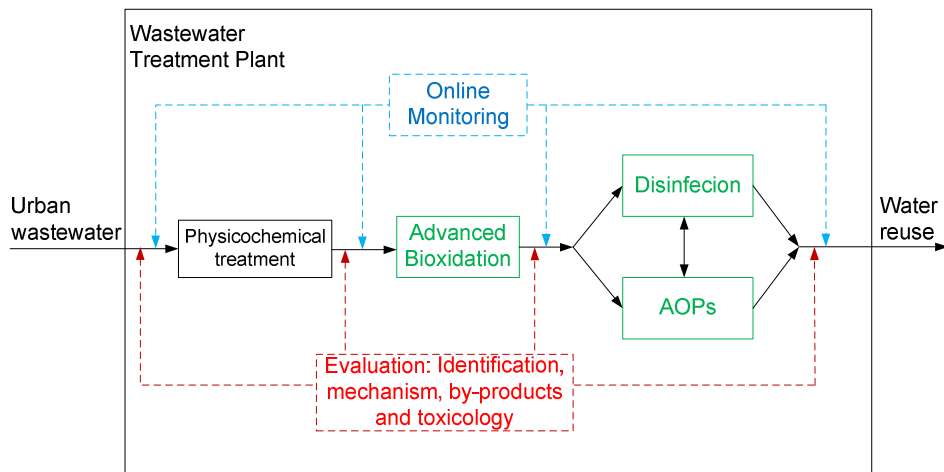
- a) Develop new processes or modifications of the current biological and disinfection technologies in WWTPs by advanced oxidation and biooxidation processes to achieve the removal of ECs before water reuse or the discharge of the effluents to the environment.
- b) Develop new technologies for the monitoring of the wastewater treatment plant operation regarding the removal of ECs, including analytical procedures and ecotoxicology assessment.
- c) Bring together the “key enabling technologies (KET)” developed in steps a) and b) to be tested in an urban wastewater treatment plant.

The general goal of the project will be accomplished through specific research objectives:

- 1.- To develop biooxidation processes with higher efficiency in the degradation of ECs, evaluating their feasibility in continuous non-sterile operation conditions.

- 2.- To increase the catalytic efficiency of TiO<sub>2</sub> materials by novel preparation and immobilization methods, evaluating their performance, lifetime and stability under long-term operation using solar light
- 3.- To develop photo-Fenton processes operating at near-neutral pH values for the simultaneous inactivation of microorganisms and removal of ECs, engineering the process for a successful scaling-up.
- 4.- To identify the ECs more refractory to the water treatment processes to be used as indicators of the wastewater plant operation efficiency, developing new sampling and analytical methodologies for their monitoring, making possible the link with the control strategies.
- 5.- To establish the mechanism of degradation of the ECs, including the identification of the transformation products and the assessment of their ecotoxicological and estrogenic impact.

The figure shows a scheme of the main concept behind MOTREM project, showing in green the water treatment processes in waterline of the wastewater treatment plant, in blue the monitoring activity and in red the analytical evaluation of ECs and their degradation mechanism.



*MOTREM Project conceptual diagram*