



aWARE - Innovative hybrid MBR-(PAC-NF) systems to promote water reuse



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Consorcio	Sociedad General de Aguas de Barcelona, Spain Empresa Metropolitana de Sanejament S.A., Spain		Pentair Water Process Technology BV, The Netherlands Laboratório Nacional de Engenharia Civil I.P., España		
Objetivo	<p>El proyecto aWARE también tiene como objetivo contribuir a la disminución de la emisión de los contaminantes prioritarios (incluidos en la Directiva Marco del Agua) y emergentes de los efluentes de las estaciones depuradoras de aguas residuales, mediante la validación de esquemas innovadores de tratamiento que combinen tecnologías de membranas, materiales adsorbentes y procesos de oxidación avanzada.</p> <p>El proyecto aWARE también tiene como objetivo contribuir a la disminución de la emisión de los contaminantes prioritarios (incluidos en la Directiva Marco del Agua) y emergentes de los efluentes de las estaciones depuradoras de aguas residuales, mediante la validación de esquemas innovadores de tratamiento que combinen tecnologías de membranas, materiales adsorbentes y procesos de oxidación avanzada.</p> <p>El proyecto aWARE se centrará en evaluar la viabilidad técnica, económica y ambiental de la tecnología de Bioreactores de Membrana (MBRs) como tratamiento de depuración de aguas residuales y de la combinación de Carbón Activo (PAC/GAC) y nanofiltración (NF) como proceso de regeneración (Ilustración 1). Se buscará potenciar las sinergias entre estas tecnologías, que serán integradas en un esquema de tratamiento principalmente enfocado a la eliminación de contaminantes prioritarios y emergentes.</p> <p>The 'aWARE' project aims to promote the re-use of reclaimed water within water management organisations. To this end, the project hopes to demonstrate the technical feasibility and economic and environmental advantages of two different technologies as advanced treatments for wastewater and reclamation facilities. The project proposes an innovative hybrid process using membrane bioreactors (MBR), powdered activated carbon (PAC) and nanofiltration (NF) to enable re-use of wastewater. It will experiment with MBR-PAC-NF configurations - including PAC dosage and cleaning conditions - to optimise their efficiency and reliability. It hopes to demonstrate the feasibility of such a process in removing contaminants, define the optimal operation for each configuration and identify risk assessment factors. The project will evaluate the energy and reagents consumption, as well as sludge and footprint minimisation of the systems. It will carry out lifecycle assessment (LCA) and cost/benefit analysis (CBA) for the environmental and economic impact of the proposed configurations to enable comparison with existing advanced treatments. Through the development of these novel approaches, the project also hopes to improve the operational flexibility and reduce the fouling effects of other reclamation processes, such as hybrid ultra-filtration and reverse-osmosis (UF-RO) systems. By consolidating knowledge about water reclamation technologies and promoting water re-use initiatives among water management bodies, the project hopes to enable both implementation of existing EU</p>				

environmental policy and further legislation in the re-use of wastewater. It ultimately seeks to contribute to a considerable water re-use scheme at EU level.

Expected results

- The project expects to demonstrate the feasibility of a MBR-PAC-NF prototype for treating reclaimed water for re-use, that will deliver:
- An optimised process with defined operating configurations and flexibility, providing long membrane lifetime and limited area requirements for the installation;
 - Improved water quality and quantity – with a quantified reduction in chemical and microbiological content;
 - Control plans for water quality monitoring, providing a basis for future risk assessment and risk management strategies;
 - Lower environmental impacts than conventional exploitation of natural water resources, as shown by quantified reductions in energy and chemical consumption and waste;
 - Reduced costs in comparison with conventional approaches;
 - Demonstrated reliability and safety – contributing to eventual regulation of the sector to ensure public and industry confidence; and
 - The fulfilment of EU Directives.