lequia UdG ECO-INNOVATIVE WATER SOLUTIONS

Technology Transfer Portfolio

Last update December 2016

Technology transfer to private and public organisations has always been a priority in our group. In addition to the high number of R&D projects with business participation and technology transfer contracts, LEQUIA researchers have obtained patents and, in 2003, founded the spinoff company Sanejament Intel·ligent S.L. (SISLtech S.L.).

Expertise

> Biological nutrient removal and recovery from wastewaters
> Bioelectrochemical systems (BES)
> Advanced adsorption and oxidation processes (AOPs)
> Membrane Bioreactors (MBRs)
> Environmental Decision Support Systems (EDSS)

Pilot plant Membrane Bioreactor (MBR)

Pilot plant Panammox® process

Patents

> **Procedimiento automatizado de control en tiempo real de un bioreactor de membranas y un sistema de control correspondiente.** Publication date: October 2010. Applicants: University of Girona / OHL Medio Ambiente INIMA S.A.U.; Inventors: Rodríguez-Roda, I.; Poch, M.; Ferrero, G.; Sipma, J.; Clara, P.; Canals, J.; Rovira, S.; Monclús, H.; ES 2 333 837 B1.

> **Bioelectrochemical Water Treatment and Apparatus.** International Publication Number: WO 2014/082989 A1. Publication date: 5 june 2014. Priority data: 28 November 2012. Applicant: University of Girona; Inventors: J. Colprim, M.D. Balaguer; S. Puig; N. Pous; PCT/EP2013/074711.

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lequia ECO-INNOVATIVE WATER SOLUTIONS
UdG

Biological nutrient removal and recovery from wastewaters

> Urban wastewater treatment through carbon, nitrogen and phosphorous removal
> Treatment of side streams with advanced technologies: anammox, partial nitritation, phosphorous recovery, etc.
> Panammox® process: nitration plus anammox process for the treatment of landfill leachates with high ammonia nitrogen content
> Biminex®: reduction of the excess sludge in extended aeration WWTPs by uncoupling catabolic and anabolic metabolism
> Biological fermentation of Syngas from excess sludge to obtain biofuels (i.e. ethanol and butanol)

Bioelectrochemical systems (BES)

> Bioremediation of contaminated groundwater or surface water.
> Microbial electrosynthesis of added values (organics and biofuels) from carbon dioxide.
> Biogas upgrading to reach high quality biomethane.
> Organic matter and nitrogen removal from urban and industrial (leachate, pig slurry and meat industry effluent) wastewaters.

Advanced adsorption and oxidation processes

> Advanced oxidation processes for wastewater treatment with H_2O_2 and/or O_2.
> Testing and characterization of adsorbent materials
> Analysis of contaminant gases (siloxanes, odorous sulfur compounds, VOC...)

Membrane bioreactors (MBR)

> Membrane fouling and clogging: from basic research of the responsible parameters to practical aspects for cleaning and monitoring.
> Integration of membrane bioreactors at different scales.
> Monitoring and automatic control of MBRs to optimize biological nutrient removal, while minimizing fouling and saving energy.
> Removal mechanisms and efficiencies of pharmaceuticals in wastewater.
> Development and validation of decision support systems for the integrated and knowledge-based supervision of MBRs.
> Use of MBR for waste gases treatment.
> Osmotic MBR for wastewater treatment.

Environmental Decision Support Systems (EDSS)

> Knowledge management and the development and implementation of multi-criteria environmental decision support systems (EDSS) in water-related systems.
> Integration of artificial intelligence (AI) techniques with conventional modelling techniques and control algorithms in EDSS to manage complex environmental systems, especially water and wastewater processes (e.g. membrane bioreactors) and fluvial ecosystems.
> Planning, designing, operating and maintaining small and decentralized systems, including natural ones, or medium and large wastewater treatment systems.
> Multi-criteria (technical and socio-economical) and life cycle analysis of UWS.
> Integrated control of the urban water cycle (sewer system, wastewater treatment plant and receiving media) to improve the ecological status of water bodies.
> Knowledge-based modelling of drinking water treatment systems.

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