GAPS

Closing Gaps of Knowledge with respect to Advanced Chemical Oxidation Processes for the removal of Contaminants of Emerging Concern

'GAPS (ΚΟΥΛΤΟΥΡΑ/ΒΕΝΣ/0412/24)', 2013-2015

CONTACT INFORMATION

Nireas-International Water Research Center

University of Cyprus

P.O. Box 20537

1678 Nicosia

Tel: +35722893512

Fax: +35722895365

E-mail: info@nireas-iwrc.org

nireas International Water Research Center

University of Cyprus

GAPS

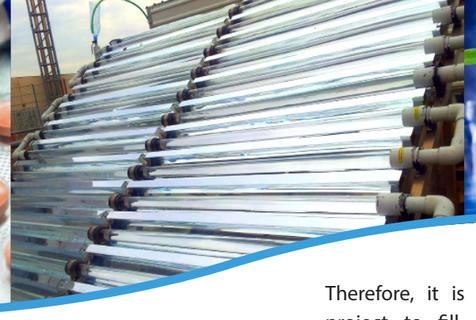
ΔΕΣΜΗ 2009-2010

Research Promotion Foundation

The project is financed by the Research Promotion Foundation (DESMI 2009-2010)








THE PROJECT AT A GLANCE

GAPS is a research project following the '2011 Nikos Symeonides Research Award' to Dr. Despo Fatta-Kassinos, Director of Nireas-IWRC, by the Cyprus Research Promotion Foundation on 5 October 2012, in recognition of her outstanding research achievements and for the project 'Development and application of innovative advanced chemical oxidation processes for the removal of xenobiotic compounds from sewage and assessment of their biological potency'. The award, the highest national distinction granted to a researcher in Cyprus, is a point of reference for Nireas-IWRC, its staff and its research work.

GAPS is an innovative project which aims to provide answers to specific gaps of knowledge with relation to (i) the dissolved organic matter (DOM) present in aqueous matrices, (ii) the capacity of solar Fenton oxidation in removing antibiotics and antibiotic-resistant bacteria, (iii) the efficiency of UV light-activated persulphate oxidation for the removal of pharmaceuticals and personal care products (PPCPs) from aqueous matrices and (iv) the efficiency of ozonation for the removal of PPCPs in relation to the bromates' formation.

'Nikos Symeonides Research Award' Ceremony

SCIENTIFIC OBJECTIVES

GAPS aims at:

- understanding the potential interferences of DOM during the application of AOPs
- evaluating the capacity of solar Fenton oxidation for the antibiotic resistance removal and disinfection potential of urban wastewater
- assessing the potential of persulphates to provide sulphate radicals and the efficiency of UV light-activated oxidation for the removal of PPCPs from aqueous matrices
- assessing the removal of PPCPs and investigating the main parameters affecting the formation of bromate ions during ozonation of aqueous matrices

CURRENT STATE OF KNOWLEDGE

Over the past several years, PPCPs are considered as an emerging environmental problem, due to their continuous input and persistence into the aquatic ecosystem even at low concentrations. This continuous release into the environment may constitute a long-term potential risk for aquatic/terrestrial organisms. In addition, due to the prolonged water scarcity, treated wastewater reuse for irrigation or aquifer replenishment is widely implemented nowadays, contributing to the release of such microcontaminants into the environment.

The conventional treatment systems are not capable of completely removing PPCPs and therefore, more advanced systems are required. Advanced chemical oxidation processes (AOPs) are technologies based on the intermediacy of hydroxyl radicals to oxidize recalcitrant, toxic, and non-biodegradable compounds to various products and eventually to inert end-products. Although the environmental applications of AOPs are numerous, including water and wastewater treatment, soil remediation, they have only recently been employed for the abatement of pollution caused by the presence of residual PPCPs in waters. Nireas-IWRC is very active in this particular field and has already tested a number of such processes for the removal of PPCPs.

Therefore, it is the intention and overall aim of this project to fill some gaps of knowledge that have been accumulated during our research activity by performing both theoretical work and fundamental research, so as to be able to establish new concrete solutions towards the more effective application of these systems and to their optimization. This is in line with the overall efforts made by our group and others to establish viable and efficient technologies able to remove such microcontaminants, in order to be able to produce treated wastewater free from PPCPs that can enhance water balances through wastewater reuse applications.

WORK PACKAGES

WP1 - Project management

WP2 - Dissemination of results

WP3 - Understanding the role of DOM during the application of advanced oxidation treatment of aqueous matrices

WP4 - Antibiotic resistance removal and disinfection potential of urban wastewater by solar Fenton at a pilot scale

WP5 - UV light-activated persulphate oxidation of PPCPs in aqueous matrices

WP6 - Removal of PPCPs from aqueous matrices and investigation of the parameters affecting the formation of bromate ions during ozonation