



EDITORIAL

A SPECIAL ISSUE DEDICATED TO *WASTEWATER TREATMENT FOR RECOVERING WATER, ENERGY, NUTRIENTS AND VALUABLE PRODUCTS*

One of the most stringent problems of our times is related to water.

“Water is the most essential good we have”, stated Angel Gurría (OECD Secretary-General) at the 5th World Water Forum in Istanbul in March 2009. Also the EU Water Framework Directive (Directive 2000/06/EC) asserts: “Water is not a commodity like the others but an inheritance which it is necessary to protect, defend and treat like such”.

Fresh water is very unevenly distributed on the planet. In some regions of the world, particularly in North Africa and the Middle East, water scarcity is becoming more severe year after year. It is a consequence of the rapid growth of the population but also of poor management of the water resources and of pollution. Nowadays, about a quarter of the world's population lives in countries that have insufficient water supplies and up to 3 billion people will suffer from scarce water by 2025 if no wide-ranging action is taken.

The daily drinking water requirement per person is 2-4 liters, but it takes 2000 to 5000 liters of water to produce one person's daily food. It takes 1000 - 3000 liters of water to produce just one kilo of rice and 13000 - 15000 liters to produce one kilo of grain-fed beef. In developing countries, 70 percent of industrial wastes are dumped untreated into waters where they pollute the usable water supply. To restore and maintain the chemical, physical, and biological integrity of the nation's waters should be a global priority mission.

The basic principles of wastewater treatment have remained unchanged for at least one hundred

years. Basically large volumes of water act as the vehicle for transporting solids in soluble or particulate form, from their site of production to a wastewater treatment facility, where usually an intensive energy demanding process takes place.

In areas of water scarcity, the water recovered from wastewater has a significant value. Furthermore, in the eco-conscious society, recovering energy, nutrients and other valuable products embedded in wastewater is the inevitable approach to face the sustainability and equity of future generations.

All these aspects have motivated the decision of the Editorial Board of *Environmental Engineering and Management Journal* to edit a special number dedicated to ***Wastewater treatment for recovering water, energy, nutrients and valuable products.***

In the context of this topic, anaerobic processes for waste and wastewater treatment allow the combined production of biogas, a renewable energy source, a digestate, and a nutrient rich wastewater that should be post treated allowing the recovery of nitrogen and phosphorous, as well as water for reuse and even raw materials such as sulfur and metals. A sustainable waste and wastewater treatment process should always focus on recovery concepts

The authors are aware of the economical perspective and also the global world impact of the process, and are looking forward to the potential interest and application in developed and under developed countries.

In this special issue selected contributions include a wide range of processes, namely fermentative, aerobic and m

ethanogenic biological processes, nitrogen removal, metals recovery, dyes removal and physico-chemical processes.

We hope that the contributions in the field of wastewater treatment aiming at recovering water, energy, nutrients and valuable products will add extra value and improvement in effectiveness of depollution and water treatment technologies through precise and reliable processes.

Madalena Alves
Guest Editor



Maria Madalena dos Santos Alves is Professor of *Chemical Reaction Engineering, Strategy of Process Engineering and Biological Wastewater Treatment* within the Department of Biological Engineering, University of Minho, Campus de Gualtar, Braga – PORTUGAL (<http://www.deb.uminho.pt/pessoas/madalena.alves/>) Her main scientific area of research includes: *Biogas and Bio-hydrogen production; Anaerobic digestion of liquids, slurries and solid wastes; Industrial wastewater treatment; Anaerobic biodegradation of lipid compounds; Combined anaerobic/aerobic biological processes; Biological nutrient removal and activated sludge processes; Environmental microbiology, Molecular ecology; Biohydrogen production from waste materials.* She is the author of more than 120 papers, patents, being involved in numerous national international research programs, as well as consultancy and project evaluations. On 23 September 2006 the Senate of the “Gheorghe Asachi” University of Iasi, Romania, in its open special session, was privileged to award the honorary title of *Doctor Honoris Causa* to Professor Madalena Alves. The proposal for the *Doctor Honoris Causa* award was initiated by the Department of Environmental Engineering and Management - Faculty of Chemical Engineering and Environmental Protection based on the existing cooperation with Professor Alves and for her leadership in many aspects of biological and chemical engineering.