



**"Gheorghe Asachi" Technical University of Iasi, Romania**



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## **EDITORIAL**

### **A SPECIAL ISSUE DEDICATED TO ENVIRONMENTAL BIOTECHNOLOGY FOR THE KNOWLEDGE-BASED BIO AND GREEN ECONOMY**

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This special issue of *Environmental Engineering and Management Journal* is devoted to the on-going research on environmental microbiology and biotechnology in the field of biodegradation/biotransformation of organics and inorganics, emerging pollutants and conventional and biobased polymers in polluted soil, sites and sediments, in the integrated valorization of wastewater, agro-food processing byproducts and waste and municipal waste, as well as in the CO<sub>2</sub> fixation and industrial exploitation of microbes from impacted or on conventional environment. It comprises some of the peer-reviewed papers presented at the international conference "Environmental Microbiology and Biotechnology in the frame of the Knowledge-Based Bio and Green Economy" (EMB2012) organized in Bologna, Italy (April 10-12, 2012; [www.emb2012.org](http://www.emb2012.org)) by the Environmental Biotechnology section of the European Federation of Biotechnology (EFB) and the University of Bologna in close cooperation with the Federation of European Microbiological Societies (FEMS), the International Society for Environmental Biotechnology (ISEB), the Environmental Biotechnology section of the Asian Federation of Biotechnology (AFOB), the European Association of Biotech Industries (EuropaBio), the Organization for Economic Co-operation and Development (OECD) and the ETP SusChem with the active participation of SIMGBM, SIMTREA, Federchimica, Italian Chemical Society, *SusChem Italy*, INCA and Ecomondo. FEMS, the DICAM Department of University of Bologna and Bracco Imaging SpA sponsored the event.

The EMB2012 hosted 3 key note lectures, 19 invited lectures, 76 oral communications and 230 poster presentations along with 3 international satellite events. About 400 delegates from 52

different Nations attended it. About 330 abstracts have been published on *Environmental Engineering and Management Journal* and over than 1/3 of them have been selected for full Ms submission in *New Biotechnology* and in the present journal.

The speakers, the authors of the posters, the session chairs, all participants displayed an active, very qualified and motivated participation in the conference, making it successful. Sixteen excellent young scientists members of FEMS affiliated societies received a FEMS fellowship. These were only 50% of the young colleagues who applied for such a grant and they, all together, are only 1/5 of overall young scientists who attended the conference. The exceptional scientific contributions and the fresh ideas provided, the discussions, and most of all, the atmosphere at the conference, make us to believe that this event remarkably contributed to the growth of environmental microbiology and biotechnology in several countries and to boost the mutual international cooperation in several of the emerging areas of the sector. During the few days of the conference the participants had the opportunity to gain insights into several advancements in environmental microbiology and biotechnology and evidenced that these domains of science and technology are playing a key role in improving the quality of the environment and boosting the European economy and a more sustainable and greener industrial growth.

The removal of toxins, viruses or pharmaceuticals from drinking water and the environment, the selection of novel and more robust microbes/enzymes and innovative technologies to the sustainable removal existing pollution, to green conventional synthetic pathways to convert organic waste and CO<sub>2</sub> into new biobased-biodegradable and biocompatible- chemicals, materials and fuels, all are very essential for implementing a more effective and

competitive biobased and green economy in the world.

This editorial paper introduces 18 papers, which constitute a representative sample of topics addressed during the conference. In a first study, Andrea Negroni et al. presented novel results on the reductive dechlorination of polychlorinated biphenyls (PCBs) in the sediments of Venice Lagoon in the presence of Nanoscale Zero-Valent Nickel-Iron (NZVNI) particles as catalysts. Johanna Puentes-Cárdenas et al. presented the main results of a study on the biosorption of trivalent chromium from aqueous solutions by *Pleurotus ostreatus* biomass, whereas Nava-Arenas et al. presented a novel acclimated microbial community able to degrade a combination of organochlorine herbicides in a biofilm reactor. Bautista-Patacsil et al. presented a paper on the role of ammonium concentration on the biodegradation and sorption of 17 $\alpha$ -ethinylestradiol in submerged membrane bioreactor whereas Alice Dall'Ara and Alessandra Bonoli described the critical issues and the durability of biofilters from untreated paper sludge in contaminated soils. Jacek Krzyżak and colleagues presented a paper on the major microbial parameters that can be adopted as bioindicators of soil quality during aided phytostabilization of metal contaminated soil whereas Jan W. Dobrowolski and colleagues provided the results of the application of Laser technology to stimulate the hydrocarbons biodegradation by *Trichophyton mentagrophytes*. Federica Spina and co-workers presented the results of a study in which they combine immobilized fungi and activated sludge in wastewater bioremediation whereas Domenico Pirozzi and coworkers described the preparation of biodiesel from hydrolizates of *Arundo donax*. Braguglia et al explored the role of sludge ultrasound

pre-treatment and of the microbial population on the anaerobic digestion of organic wastes whereas Wendy E. Varo-Arguello presented their triphasic slurry bioreactors for the bioremediation of lindane-impacted soil under aerobic and anaerobic conditions. Alice Dall'Ara et al. investigated an innovative procedure to characterize properties from tailored compost, Yoshiyuki Ueno and Yoji Kitajima the methods for suppression of methane gas emission from sediment using a bioelectrochemical system and Manivannan Sethurajan et al. proposed the use of mesophilic mixed populations in an air up-lift bioreactor for bioleaching of copper from black shale ore. Das et al. analyzed the enzymatic processing of chitinous wastes for N-acetyl-d-glucosamine production, as an example of green and efficient environmental management.

The special issue also includes some studies about effects of industrial cleaning on wheat microbial burden and deoxynivalenol levels, developed by Neagu et al., as well as those of Mareci et al. about corrosion behavior of CoCrMo alloy in non-pasteurized and pasteurized apple juice. The EMB2012 was a very successful Conference. We believe that this collection of papers may be useful to people who were not able to participate directly. It is towards those individuals that it is directed to.

**Fabio Fava**

*Department of Civil, Chemical, Environmental and Materials Engineering-Alma Mater Studiorum-University of Bologna, Italy*

**Maria Gavrilescu**

*Department of Environmental Engineering and Management, "Gheorghe Asachi" Technical University of Iasi, Romania*

**Guest Editors**



**Fabio Fava** (1963), with a Laurea degree cum laude in "Chemistry and Pharmaceutical Technologies" (University of Bologna, Italy) and a Ph.D. in "Applied Microbiology" (ICT, University of Prague, Czech Republic), is Full Professor of "Industrial & Environmental Biotechnology" at the School of Engineering and Architecture of the *Alma Mater Studiorum- University of Bologna* (Italy), where he is involved in several R&D projects in the area of industrial and environmental biotechnology, among others the European FP7 projects NAMASTE and BIOCLEAN as coordinator, and the ECOBIOCAP, MINOTAURUS, ULIXES, ROUTES, KILL SPILL and WATER4CROPS . He published about 170 scientific papers (80 of which on medium/high IF peer-review international journals) in the same areas. He is chairing the "Environmental Biotechnology" section of the European Federation of Biotechnology (EFB), the "Industrial and Environmental Biotechnology" section of Italian SusChem Technology Platform, and is the Italian Delegate in the Task Forces on "Industrial Biotechnology" and on "Environmental Biotechnology" of the Organisation for Economic Co-operation and Development (OECD, Paris) and in the "Ad-hoc Advisory Group for the Lead Market Initiative for Biobased Products" (DG-Enterprise and Industry of European Commission, Brussels) and the Chair of the Scientific and Technological Committee of the International annual Exhibition on Material and Energy Recovery and Sustainable Development ECOMONDO (Rimini, Italy).



**Maria Gavrilescu** (1956) is professor at the Department of Environmental Engineering and Management- Faculty of Chemical Engineering and Environmental Protection of the „*Gheorghe Asachi*” Technical University of Iasi, Romania, where she teaches courses in Chemical and Biological Process Engineering, Process Synthesis and Analysis, Integrated Pollution Prevention and Control, Sustainable Industrial Production, Environmental Risk Assessment and Management. She supervises doctoral thesis in the fields of Chemical and Environmental Engineering. Prof. Gavrilescu has authored more than 380 books and articles in the fields of chemical and environmental engineering, pharmaceutical and environmental biotechnology, pollution prevention and cleaner production, and risk assessment and management. She has also managed or participated in 19 national and 7 international research projects and 25 research projects with industrial companies. She is a member of Experts Group of the "Environmental Biotechnology" section of the European Federation of Biotechnology (EFB), and Managing Editor of the *Environmental Engineering and Management Journal*.