



Sustainable waste management

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It is true that a lot of research teams work worldwide in the field of solid waste management and the status of waste management still has to improve in order to help towards higher quality standards in everyday life. This Special Issue of *Environmental Science and Pollution Research* includes 25 waste-related papers, which were selected by the Scientific Committee of the ATHENS 2017 5th International Conference on Sustainable Solid Waste Management (<http://www.athens2017.uest.gr>) held in Athens, Greece, from 21 to 24 June 2017 with the presence of 600 participants from all over the world.

As in the cases of the previous international conferences:

- ATHENS 2012 (<http://athens2012.uest.gr>),
- ATHENS 2014 (<http://www.athens2014.biowaste.gr>),
- TINOS 2015 (<http://www.tinos2015.uest.gr>) and
- CYPRUS 2016 (<http://www.cyprus2016.uest.gr>),

the ATHENS 2017 5th International Conference actually made a step forward in the area of waste management by promoting new aspects and achievements at technology level.

Without doubt, the series of our conferences keep attracting the attention of the international scientific community, private and public sector local authorities and businesses. This is proven by the significant increase in the numbers of registered participants, the number of origin countries of the participants and the number of abstracts received and the full papers presented orally and by poster during the 27 different conference sessions.

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Substantial effort is made to keep high-quality standards in scientific papers and increase the visibility of the work, as proven by the increase of the papers finally published in the collaborating high reputation journals. At the same time, focus is given on the attempt to achieve high-quality services for the conference participants and make them familiar with the Greek hospitality and tradition.

The ATHENS 2017 Conference stimulated the interest of the scientific community and the competent authorities of public and private sector and informed them about the latest developments and achievements in the field of solid waste management with special emphasis on municipal solid waste. Biological treatment (both composting and anaerobic digestion), the treatment at central facilities, waste prevention, separation at source and recycling also constituted top priority subjects of the conference agenda. The new concept of this conference was the attempt to strengthen the links with industry. Emphasis was given to food industry, energy consumption and saving, carbon footprint and water footprint, zero-waste initiatives, marine litter and energy-land-food-water nexus. Furthermore, circular economy and symbiosis networks were core subjects of the conference focusing on food waste, plastics, biomass and bio-based products, construction and demolition waste and critical raw materials in all key action areas.

The Conference provided an opportunity to bring closer scientists and professionals from governmental departments, municipalities, private institutions, research and education institutions and industry, being a forum for the exchange of the most recent ideas, techniques and experiences in all areas of waste management. Furthermore, the Conference addressed the management of sewage sludge and liquids/effluents which are produced by waste management processes. In addition, solid materials used to remove contaminants from the liquid phase were also examined.

A special session focused on waste management and the role of local authorities and municipalities for taking advantage of both recyclable materials and biowaste. Last but not least, the intention of the Conference was to seek and promote

networking opportunities through a session devoted to Environment-related Competitive EU Programmes.

The Conference celebrated the 25th Anniversary of LIFE, the financial tool of European Commission for the Environment and was organised within the LIFE FOODPRINT project (LIFE13 ENV/GR/000958) (www.foodprint.gr). This project contributed significantly to the identification, quantification and implementation of measures for reducing the carbon footprint of the food industry sector including waste management.

The Conference agenda was dense and rich, offering a considerable variety of topics presented through almost 350 presentations within the 26 different oral sessions and an extensive poster session throughout the conference duration at Aegli Zappiou in Athens. Also, visits took place to waste management facilities in the Attica Region.

The 25 waste-related papers included in this Special Issue cover several different subjects targeting at sustainable waste management. More specifically, the first paper of the Special Issue refers to passengers' waste generation during flights, while the second paper deals with spent coffee grounds, presenting it as a new resource and value-added product with environmental benefits. Solid waste management in small island developing states with Seychelles as case study is the subject of the third paper. The next papers deal with biological waste treatment methods. The fourth paper presents the effects of different vermicomposting extracts of palm oil mill effluent and palm pressed fibre mixture on seed germination of mung bean and its relative toxicity, while the fifth paper discussed the recycling of wastes from fish beneficiation by composting. The next paper (sixth) related to biological processes presented a multi-criteria sustainability assessment framework for comparing the use of food waste disposal units and the anaerobic co-digestion of separately collected food waste with sewage sludge, while the seventh one deals with the removal of tetracyclines, sulfonamides and quinolones in different types of composting/digesting processes.

Furthermore, the next subject addressed in the eighth paper is a comparative evaluation of the performance of full-scale high-rate methane biofilter (HMBF) systems and flow-through laboratory columns, while the next paper (ninth) presents research work on biogas upgrading by accelerated carbonation of wood combustion ash.

The 10th and 11th paper of the Special Issue are related to thermal technologies. More specifically, the 10th paper refers to modelling the emissions of a dual-fuel engine coupled with a biomass gasifier, supplementing the Wiebe model, while the next one discusses the pyrolysis of wastewater sludge and composted organic fines from municipal solid waste.

The 12th paper examines the fractionation and leachability of Fe, Zn, Cu and Ni in the sludge from a sulphate-reducing bioreactor treating metal-bearing wastewater.

The following papers focus on agricultural solid waste. The 13th and 14th paper come from the same Brazilian team discussing agricultural solid waste for sorption of metal ions. The first one deals with the characterisation and use of lettuce roots and sugarcane bagasse for Cu(II), Fe(II), Zn(II) and Mn(II) sorption from aqueous medium, while the second presents the competitive assessment in multielement solution and lake water. The next papers also focus on agricultural subjects. The 15th paper deals with alternative soilless media using olive mill and paper waste for growing ornamental plants, while the 16th paper develops the remediation potential of caffeine, oxybenzone and triclosan by the salt marsh plants *Spartina maritima* and *Halimione portulacoides*. The following paper (17th) is related to energy crops applied to landfills, presenting functional, environmental and cost analysis.

Then, three biotechnology-related papers are included in the Special Issue. The 18th paper presents the integral use of plants and their residues, focusing on the case of cocoyam (*Xanthosoma sagittifolium*) conversion through biorefineries at small scale. The next paper (19th) develops the fumaric acid production using renewable resources from biodiesel and sugarcane production processes, while the techno-economic and environmental assessment of biogas production from banana peel (*Musa paradisiaca*) in a biorefinery concept is the title of the 20th paper.

Next, the 21st paper has the innovative subject of processes and electron flow in a microbial electrolysis cell bioanode fed with furanic and phenolic compounds.

The characterisation of drilling waste from a shale gas exploration in Central and Eastern Poland is the research topic of the 22nd paper, while the 23rd paper discusses the fluorinated waste and firefighting activities with emphasis on the biodegradation of halogenated foams from petrochemical refinery soil. Finally, the last two papers of the special issue address recycled aggregates. The 24th paper refers to upscaling the pollutant emission from mixed recycled aggregates under compaction for civil applications, while the last 25th paper of the special issue presents the environmental risk assessment of extensive green roofs with fine fraction of mixed recycled aggregates from construction and demolition waste.

We would like to thank Dr. P. Garrigues, the Editor-in-Chief of Environmental Science and Pollution Research for providing us with the opportunity to prepare and publish this Special Issue on sustainable waste management, as well the LIFE+ Programme of the European Commission for the financial support of the FOODPRINT project.



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working in EU-funded projects in several positions: project manager, technical expert, training and dissemination expert. He has cooperated with the European Commission directly, as he acted as TAIEX expert (institutional building) in Slovakia, Romania, Turkey, Bulgaria and Serbia. He has long teaching and training activity in the field of environment in different countries and has been Collaborating Teaching Staff for the Hellenic Open University since 2014 (Subject: Solid Waste Management). He has more than 200 publications in journals and conferences and several editorials, while he has had key role in the organisation of several scientific big international conference events being Head of the Organising Committee for this series of conferences on Sustainable Solid Waste Management.



Prof. Maria Loizidou was educated at the University of London where she obtained her PhD in chemical engineering focusing on the field of environmental protection. She followed an academic career being Professor at the National Technical University of Athens in the School of Chemical Engineering and Head of the Unit of Environmental Science and Technology (www.uest.gr).

Her efforts are continuous in the field of the environmental protection and human health, enhancing education, research technology and innovation. She has been scientific responsible for more than 170 environmental projects supporting competent authorities, municipalities and others (<http://www.uest.gr/index.php/projects>). She has more than 500 publications in international scientific journals (<http://www.uest.gr/index.php/publications>) and conferences and 7000 citations.

Prof. Loizidou has established this successful series of international conferences on Sustainable Waste Management being the Head of the Scientific Committee and bringing together academics, private and public sector, local authorities and business from all over the world.

Prof. Loizidou received the first Green AWARD, since the SOLBRINE project was voted as the best LIFE ENVIRONMENT project for the period 1992–2017 among more than 4000 LIFE projects.