Editors:
Prof. Ali Kallel, Dean of the Faculty of Sciences, Sfax University, TUNISIA
Prof. Abdelhamid Hassairi, Sfax University, TUNISIA
Prof. Cornelia Aida Bulucea, University of Craiova, ROMANIA
Prof. Nikos Mastorakis, Technical University of Sofia, BULGARIA

Advances in Waste Management

4th WSEAS International Conference on Waste Management, Water Pollution, Air Pollution, Indoor Climate (WWAI '10)

Sponsor and Organizer:
University of Sfax,
Faculty of Sciences of Sfax

Kantaoui, Sousse, Tunisia, May 3-6, 2010

Energy and Environmental Engineering Series
A Series of Reference Books and Textbooks

ISBN: 978-960-474-190-8
ISSN: 1790-5095

Published by WSEAS Press
www.wseas.org

Advances in Waste Management

ADVANCES in WASTE MANAGEMENT

4th WSEAS International Conference on WASTE MANAGEMENT, WATER POLLUTION, AIR POLLUTION, INDOOR CLIMATE (WWAI '10)

Kantaoui, Sousse, Tunisia
May 3-6, 2010

Sponsor and Organizer:
University of Sfax, Faculty of Sciences of Sfax

Energy and Environmental Engineering Series
A Series of Reference Books and Textbooks

Published by WSEAS Press
www.wseas.org

ISSN: 1790-5095
ISBN: 978-960-474-190-8

ADVANCES in WASTE MANAGEMENT

4th WSEAS International Conference on WASTE MANAGEMENT, WATER POLLUTION, AIR POLLUTION, INDOOR CLIMATE (WWAI '10)

Kantaoui, Sousse, Tunisia, May 3-6, 2010

Sponsor and Organizer:
University of Sfax, Faculty of Sciences of Sfax

Energy and Environmental Engineering Series
A Series of Reference Books and Textbooks

Published by WSEAS Press
www.wseas.org

All papers of the present volume were peer reviewed by two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.
See also: http://www.worldses.org/review/index.html

ISSN: 1790-5095
ISBN: 978-960-474-190-8

World Scientific and Engineering Academy and Society

ADVANCES in WASTE MANAGEMENT

4th WSEAS International Conference on WASTE MANAGEMENT, WATER POLLUTION, AIR POLLUTION, INDOOR CLIMATE (WWAI '10)

Kantaoui, Sousse, Tunisia
May 3-6, 2010

Sponsor and Organizer:
University of Sfax, Faculty of Sciences of Sfax

Preface

This year the 4th WSEAS International Conference on WASTE MANAGEMENT, WATER POLLUTION, AIR POLLUTION, INDOOR CLIMATE (WWAI '10) was held in Kantaoui, Sousse, Tunisia, May 3-6, 2010. The conference remains faithful to its original idea of providing a platform to discuss waste management, water pollution, air pollution, indoor climate etc. with participants from all over the world, both from academia and from industry.

Its success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of this conference are published in this Book that will be indexed by ISI. Please, check it: www.worldses.org/indexes as well as in the CD-ROM Proceedings. They will be also available in the E-Library of the WSEAS. The best papers will be also promoted in many Journals for further evaluation.

A Conference such as this can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors

Table of Contents

Plenary Lecture 1

Wastewater Reuse in Arid Irrigated Areas - Control of Soil Salinity

Professor Jose Beltrao
University of Algarve
Campus de Gambelas, 8005-139 Faro
PORTUGAL
E-mail: jbeltrao@ualg.pt

Abstract: Due to the lack of water around the arid areas, potable water luxurious uses - are increasingly contested. In order to solve this problem, non conventional water resources, like treated wastewater, gained increasing role in the planning and development of additional water supplies in irrigated areas. Hence, wastewater recycling should be more implemented, especially in arid and semiarid regions, where the water shortage is an important limiting factor for the economy, in order to avoid drastic measures of consumers selection. In most cases, the intense use of effluent for irrigation attracted public awareness in respect of contaminating pathogens, heavy metals, salts and other chemicals. For safe wastewater reuse in irrigation is generally used the tertiary effluent, without advanced treatments (like membrane technologies) due to their high costs. Therefore, wastewater will conserve its salinity, contaminating irrigated soils and decreasing plant growth. The objective of this work is to present techniques used to control soil salinity, according to the sustainability of the soil and water conservation in arid irrigated areas. These techniques include the conventional techniques (leaching, salts plus fertilizers combination and the use of salt tolerant crops) and environmentally safe and clean procedures (salt removing species, drought tolerant crops and visual appearance). Results of the application of these techniques are presented. It may be seen that clean procedures may be not enough to solve the salinity problems. Hence, it is concluded that the clean and environmental safe procedures salinity could be associated to the conventional techniques, combining environmental, economical and social aspects, contributing, therefore, to increase the sustainability of irrigated areas and plant growth.

Plenary Lecture 2

Clean Technology from Waste Management

Professor Ioana Ionel
Director Dep. MMUT, Director Centru Cercetare
Universitatea POLITEHNICA Timisoara
Facultatea de Mecanica
Departament Masini Mecanice, Utilaje si Transporturi
Bv. M. Viteazu 1, 300222, Timisoara, ROMANIA
E-mail: ioana.ionel@mec.upt.ro

Abstract: Waste is representing an important environmental pollution source, not only for the soil and ground water, but also for the air. Deposit in open land fields is not allowed according European standards and the EU countries have met national regulations to close the exiting non-ecological deposits and turn them into ecological ones. Also the general management for the waste is to be accordingly re-evaluated and shaped in a novel. Manner. Waste is representing also an energy source, that should be not wasted. The waste (mainly municipal waste) must be properly reused as it represents material and energy content, Combustion , fermentation and recycling are possible solution for turning the waste management into a business, also reducing simultaneously the environmental damages risen by the enormous waste quantities, nowadays. The presentation will focus on clean combustion and co-combustion of waste, and on technologies to turn the energy content of the waste into other cleaner energy sources, such as combustible gas. One will rise attention also about the barriers - technical and mental - to apply correct waste management. And to the consequences of not given by the society the correct input to this matter.
Examples from the author's experience and literature will elucidating the conclusions.

Brief Biography of the Speaker:
Ioana IONEL is professor at the "POLITEHNICA" University of Timisoara from Romania and guest professor at the Technical University from Munich, Germany. Her scientific development was mainly influenced by two events: PhD degree awarded 1987 and the Alexander von Humboldt fellowship, starting 1991. She has as main area of expertise for teaching and research topics concerning Thermodynamics, Clean Combustion, Environmental protection and Renewable Energy applications. 2001 she habilitated based on a thesis and research concerning the quality of air, methods for investigations and clean technologies' applications for power plants. She is leader and director of a specialized research centre and department (http://www.mec.upt.ro/~dep4), consisting of different ISO 17025 attested labs, mainly the air quality (www.mediu.ro) monitoring and renewable energy resources are to be mentioned (http://energieregen.mec.upt.ro). She is author of several books in Romanian, German and English, notable are the recent series of literature authored or coordinated concerning renewable energy resources such as biomass, biofuels, biogas, bioenergy in general. Her activity consists both in lecturing at home and abroad, as invited professor, also for summer schools. Numerous research project, on national or European/international level have been coordinated, as well as expertise grants are offered to the private industrial sector. The coordination of PhD students is also notable.