

Preface

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This special issue focuses on the status and trends for the treatment of municipal solid waste (MSW) in Europe and all over the world. Particular attention is given to biological and thermal processes and their suitability to generate energy from MSW.

The application of biological systems other than landfills for the treatment of organic solid wastes is wide spreading all over the world due to their economical advantages over thermal treatments. Among biological treatments both aerobic and anaerobic processes are assessed and compared in Part I of this special issue. The best available procedures to optimize the design, operation and process control of treatment plants are discussed, analyzing the criteria to maximize the plant performances both in terms of cost effectiveness and treatment efficiency. Particular attention is given to the need of pre-treating the substrates in order to change their physical and/or chemical characteristics before their biological degradation in order to make organic solids more accessible and degradable to microorganisms. The effectiveness

of mechanical–biological treatment plants to produce materials that can be utilized for material/energy recovery is also assessed as well as the potential of fruit and vegetable wastes as novel biosorbents.

Thermal processes (e.g. incineration, gasification, pyrolysis) are more expensive than biological ones as very high temperatures have to be reached. However, biological systems can only be used for the treatment of the MSW biodegradable fraction, whereas thermal plants are suitable to treat various MSW fractions. The most recent research results and developments on the evaluation and reduction of thermal treatment emissions and residues (e.g. ultrafine and nanoparticles, dioxins, furans, carbon monoxide, nitrogen oxides, fly ash and bottom ash) are presented and discussed in part II of this special issue. The applicability of Geographic Information Systems for large scale monitoring of environmental contamination due to uncontrolled waste disposal is also discussed in Part II.

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