



LIFE Project Number  
<**LIFE05 TCY/MA/000141**>

FULL PROJECT TITLE

**‘Design and Application of an Innovative Composting Unit for the  
Effective Treatment of Sludge and other Biodegradable Organic  
Waste in Morocco, MOROCOMP’**

**Task 7: Dissemination and training**

**Deliverable 21C  
Presentations of MOROCOMP project in other conferences**



**June 2008**

**Orbit 2008. “Moving Organic Waste Recycling towards Resource Management and for Biobased Economy” 6th International Conference in Wageningen, the Netherlands 13<sup>th</sup> to 15<sup>th</sup> of October 2008**

Design of a prototype composting bioreactor for the treatment of sewage sludge and other organic waste. D. Malamis, S. Malamis, E. Kapetanios, M. Loizidou

Executive summary

This work was carried out in the framework of the LIFE-Third Countries Project with title ‘Design and Application of an Innovative Composting Unit for the Effective Treatment of Sludge and other Biodegradable Organic Waste (BOW) in Morocco (MOROCOMP)’ funded by the European Community. The design and construction of the composting bioreactor took place at the premises of the National Technical University of Athens in Greece, while the start-up of the bioreactor took place in Morocco in March-April 2007.

The main objective of this work was to design, construct and test an innovative state-of-the-art composting system for the treatment of sewage sludge generated by Urban Wastewater Treatment Plants and other biodegradable organic waste (BOW). The challenge was to produce a prototype bioreactor system that can combine issues such as the production of high quality compost that can be safely applied in agriculture using different BOW, the system effectiveness and the minimization of environmental hazards from the bioreactor operation.

The composting system that was designed, constructed and operated consists of a cylindrical in-vessel bioreactor having a total volume of 3.979 m<sup>3</sup> and a workable initial volume of approximately 2.4 m<sup>3</sup>. The bioreactor operates in a batch mode and at a solids retention time of approximately 25 days. Substrate agitation is achieved via a revolving axle which runs along the interior of the bioreactor. Parameters such as the air and water supplied for the biological processes and the duration of substrate agitation are automatically controlled so that the substrate has an optimal temperature, oxygen and moisture level during the composting process. The air emissions from the process were treated by a suitable biofilter whereas leachates were collected in a pond.

The in-vessel composting bioreactor operated successfully for a trial period during which it was fed with sewage sludge, green waste and manure. No operational problems were recorded, while the compost mix achieved the desired thermophilic (>40°C) and mesophilic (30-40°C) temperatures for several days. The compost mix remained in the bioreactor for a time period of 23 days. The end compost was of high quality, while odours from the bioreactor were effectively removed by the biofilter.

To conclude the successful design, construction and start-up of an in-vessel composting bioreactor took place. The design has taken into consideration local characteristics, proven technology, cost issues, minimization of odours and resulted in the production of high quality compost.