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COMPARATIVE EVALUATION OF PROCESS PERFORMANCE OF COMPOSTING PLANTS IN GREECE AND FINLAND

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EXTENDED ABSTRACT

Composting is one of the main options available to meet the targets of the Landfill Directive regarding diversion of biodegradable wastes from landfills. In contrast with other EU countries, experiences on composting processes in Greece are still very limited, consisting only of the Kalamata facility, while the much larger plant in Ano Liosia will soon begin operation. Finland on the other hand, while ten years ago was grouped together with Greece in those EU countries that had not made any progress in organic waste management, today boasts an extensive source separation programme for organic waste and over 60 composting plants from which over 20 plants are composting source separated biowaste.

Process performance is essential for the viability of a composting plant as it determines not only the quality of the compost produced, but also the relation with the neighbours and the risks of closure. The aim of this project was to compare process performance parameters, relating both to product characteristics and odour production, of the Kalamata plant, using the composting bay system, with the Oulu plant in Finland, using drum bioreactors.

Samples from the two plants were analysed for their physical, chemical and biological characteristics including stability (SOUR, SOLVITA® and self-heating test), and pathogenic and indicator microorganisms (faecal coliforms, faecal streptococci, enterobacteriaceae, *Staphylococcus aureus*, *C. perfringens* and *Salmonella* sp.). The SOUR and the self-heating tests gave comparable results, indicating that the material is partially only stabilised after the bioreactor, with significant further stabilisation occuring at the maturation phase. A fairly good level of sanitisation was achieved for most, but not all, samples in both plants, indicating that a better level of process control may be required.

Volatile organic compounds (VOCs) and odours were analysed in air samples obtained with Tenax GR adsorption tubes. In Kalamata air sample was obtained from the semi-closed building covering the bay, near its middle. In Oulu air samples were obtained from inside the drum bioreactor and from its hall. Air samples were analysed using thermal desorption-GC-MS (also purge&trap) method. The most abundant VOCs in Kalamata plant were alcohols, carboxylic acids and esters, aromatic hydrocarbons and terpenes, most of which were above their threshold odour concentrations (TOC). The most abundant VOCs inside the drum of Oulu plant were ketones, alcohols, carboxylic acids and esters, and terpenes.

Key words: MSW, composting, odour analysis, process performance, compost quality, stability, pathogenic microorganisms, source separation