

Design and construction of pilot scale aerated static pile composting systems

Kamil EKINCI¹, Recep KÜLCÜ¹, İsmail TOSUN², Seyit AHMET İNAN³, Murat MEMICI¹, Barbaros S. KUMBUL¹

¹Suleyman Demirel University, Agricultural Faculty, Agricultural Machinery Department, 32260, Isparta, Turkey, (e-mail: kamilekinci@sdu.edu.tr)

²Suleyman Demirel University, Engineering Faculty, Department of Environmental Engineering, 32260 Isparta, Turkey

³Suleyman Demirel University, Technology Faculty, 32260 Isparta, Turkey

Abstract

The amount of agro-industrial waste, animal manure, which is a by-product of animal production and waste emerged from plant production has increased due to increase in agricultural production both in Turkey and in the world. Therefore, a sustainable management of waste is required, and is a major challenge facing agricultural and industrial sectors in Turkey. Composting, which is one of the valorisation methods used to accelerate decomposition and stabilization of organic waste, is well known and is getting widespread. This study covers design and instrumentation of four-automatically controlled pilot scale aerated static pile composting systems based on engineering principles. With this system, basic scientific data (decomposition rates of composting materials, optimum temperature and humidity values, etc) which are required for construction of large-scale composting facilities and operation of composting process will be obtained. The system consists of aeration system pipes, control and data acquisition, measurement of composting variables (temperature, CO₂/O₂/CH₄, volumetric flow rates, energy consumption). In this study, each components of this system will be introduced. This study has been conducted under the program of 1007 of the scientific and technological research council of Turkey.

Key words: composting, instrumentation, aerated static pile composting

sa2015_a0126