

TECHNOLOGIES OF WASTE CHARACTERIZATION AND COMPLEX MATRICES

Innovations and Benefits - The processes such as composting, biostabilization and bio-drying are often used for the treatment of municipal waste and biomass and consist of an aerobic treatment aimed at the complete degradation of the fermentable organic component to obtain biologically stable and useful products for agriculture or suitable for being landfilled. The dynamic respirometric index (IRD) is a method that is performed to measure the biological stability of these organic matrices both as they are and treated. Furthermore, the respirometer is profiled as a pilot biocell capable of simulating the process conditions in an industrial scale plant and can be used to study the correlation between the main control parameters (oxygen, temperature, humidity) and odor emissions or the quality of the final product or test new materials to be used as biofilters.

Furthermore, waste, and not only organic fermentable waste, can be characterized by:

- elementary analysis (AE, content of C, H, N, S, O and Cl of solid and liquid matrices);
- immediate analysis (AI, volatile solids content, ash and fixed carbon);
- higher heating value (PCS);
- thermal analysis (degradation temperature, weight loss, heat of reaction / transformation).

Use - Determination of the compost IRD and stabilized organic fraction (FOS).

Simulation of aerobic stabilization processes.

Thermochemical characterization of an organic matrix.

Applications and ongoing Activities - Measurements of Dynamic Respirometric Index were performed using the Costech 3024 respirometer following UNI / TS 1184 (Di.Pro.Ve Method) on compost samples from community composting plants and industrial plants. The Immediate Analysis is a Macro Vario Cube Elementar analyzer. The instrument allows the measurement of up to 500 mg of sample which is particularly useful to carry out analyzes on heterogeneous samples such as waste. A Mettler Toledo TG / DSC TG / DSC 2950 and a SETARAM 92-16.18 thermobalance are used for the Immediate Analysis and thermal analysis. Finally, the direct measurement of the PCS can be performed using an IKA C5000 calorimeter.

