

Measuring the stability of organic waste

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The number of waste treatment facilities using biological processes to biodegrade waste has been increasing over the years. These installations receive municipal and industrial organic wastes with the common main goal of reducing their biodegradable organic matter content.

Composting, anaerobic digestion, and mechanical-biological treatment plants contribute to organic matter recycling and energy recovery, and avoid landfilling.

The general goal of those facilities is to stabilize the organic wastes. Stability is defined as the extent to which readily biodegradable organic matter has decomposed. Microorganisms perform the work of [decomposition](#), but what determines when they are finished? A consensus has not yet been reached concerning the most suitable measurement of biodegradable organic matter, or stability, in a solid organic waste. A method for the measure of stability will allow for the proper analysis and design of waste treatment facilities and it is required to evaluate their efficiency.

The composting research group at Autonomous University of Barcelona led by Dr. Antoni Sánchez has investigated different methodologies to measure stability focusing on biological indicators, in a study funded by the Spanish Science and Education Ministry and the Catalonia Waste Agency. Authors have presented an improved methodology in the March-April 2010 issue of the *Journal of Environmental Quality*, which offers a reliable measurement of the biodegradable organic matter content in organic solid materials, useful for researchers and industrial operators. The journal is published by the American Society of Agronomy, Crop

Science Society of America, and Soil Science Society of America.

This study analyzed samples of food and garden wastes, mixed municipal solid wastes and sludge from wastewater treatment plants. The proposed methodology measures the respiration activity of microorganisms in the waste samples and establishes different respiration indices based on how fast those [microorganisms](#) consume oxygen and how much oxygen they have consumed.

The authors have established that respiration indices can be used as a measure of the biodegradable organic matter content and stability of organic materials and have defined the most suitable form of expression for those indices. Highly biodegradable wastes will have higher respiration rates, and wastes of low biodegradability will have lower respiration rates.

Research is ongoing at the Autonomous University of Barcelona to apply the developed methodology as a diagnostic tool in waste treatment facilities as well as to investigate the effect of stability on greenhouse gas emissions and the overall environmental impact of waste management systems. The authors highlight the need for an agreement of an international standard to be used by researchers and operators in the [waste](#) management field.

More information: View the abstract at jeq.scijournals.org/cgi/content/full/39/2/706

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