

COMPARISON OF LEACHING TESTS FOR THE CHARACTERIZATION OF WASTE

**M. CHRYSOCHOOU^{1,2}, B. BILITEWSKI¹, N. MOUSSIOPOULOS²
and A. KARAGIANNIDIS²**

¹Institute for Waste Management and Contaminated Site Treatment,
Dresden University of Technology, Pratzschwitzer Strasse 15, Pirna, Germany

²Laboratory of Heat Transfer and Environmental Engineering
Department of Mechanical Engineering, Aristotle University

54124 Thessaloniki Box 483 Greece

E-mail: marisa@aix.meng.auth.gr

EXTENDED ABSTRACT

According to European legislation “the composition, leachability, long-term behaviour and general properties of a waste to be landfilled must be known as precisely as possible” (Landfill Directive 1999/31/EC). Leaching tests are experimental methods that assess the contamination potential of wastes by simulating the process of dissolving and transportation of the chemicals in the soil or the landfill body. These processes are governed by a multitude of physical, chemical and biological factors, such as the pH, redox conditions and organic content of the soil. Different leaching tests abstract these conditions in varying degrees, in order to minimize cost, time and work effort. Batch tests consist the maximum abstraction of dissolving and transportation processes, as they rely on the creation of a solution by adding water to a small amount of solid and employing a form of kinetics (e.g. rotary extraction) over a limited period of time (usually 24h).

The present study deals with the assessment of the mobilisation potential of contaminants (C and N compounds, anions, heavy metals) from five types of mass waste. The following batch tests are employed: 1) The elution with water according to DIN 38414-S4 (DEV S4), 2) The extraction by ammonia nitrate according to DIN 19730, 3) The soil saturation extract (SSE) and 4) The pH-static-test under fixed pH conditions.

The statistically most reliable test proves to be DEV S4, due to high liquid-soil ratio (L:S) and the strong mechanical agitation. DEV S4 also presents a consistent and thus predictable release of all chemical compounds in the five materials. The employment of a low L:S ratio in SSE, the use of high ion strength solution in the ammonia nitrate extraction and the extreme pH conditions in the pH-static-tests lead, on the contrary, to higher standard deviations, increase the number of outlying values and provide inconsistent results within the materials, since the chemical composition varies and is significantly influenced by extreme boundary conditions. The use of DEV S4, which served as basis for the European standard leaching method EN 12457, is therefore recommended for general waste characterization.

A comparison of the results with limit values set by the Council Decision 2003/33/EC reveals that incineration ash can be classified as inert waste, indicating the efficiency of incineration as a treatment method, while material from mechanical-biological treatment of mixed household waste does not meet the limit values for non-hazardous waste, imposing indirectly separate collection of individual fractions such as organic waste.

Key words: Waste Characterization, Deposition, Leaching, Batch Tests, Landfill Directive