

Extended Abstract

# Evaluation of Harmful Factors of Municipal Solid Waste in Order to Be Valorized in Industrial Application <sup>†</sup>

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Municipal waste disposal is an issue that is important to the management of any urban area. Cities without a functioning waste-disposal plan face the risk of diseases running rampant and economic activity grinding to a halt [1]. The safety and acceptability of many widely-used solid waste management practices are a serious concern from a public health perspective. The quantity and composition of municipal solid waste (MSW) varies from place to place, and bears a rather consistent correlation with the average standard of living. Waste recovery is one of the objectives of the national strategy. One method of recovery is the valorization of waste to produce fuel, while others suggest its incorporation into building materials [2–4].

The paper presents the chemical analysis and heavy metal composition of solid municipal waste for quantification of harmful compounds. Samples were obtained from a historical Romanian municipal solid waste disposal site.

Samples collected from 30 points were characterized from a heavy metal and corrosive agent (Cl-) content point of view. Specifically, analyses for determination of the calorific value, ash content and oxidic composition were carried out. In addition, determination of the heavy metal content (mercury, cadmium, cobalt, chromium, copper, manganese, nickel, lead, styrene, thallium, vanadium and zinc) was performed using graphite oven atomic absorption spectrometry, and a NovAA 400 hydride generator. To determine the calorific value of the waste, an IKA WERKE-type calorimetric pump was used. The chlorine content (considered a corrosive agent) and oxide composition of the ash was determined by wet chemistry.

The results obtained showed that:

- the content of heavy metals had a wide range of variation, with different domains depending on the type of element
- the minimum content of Cl determined was 0.68% and the maximum value recorded was 2.01%
- the limits of variation for the lower calorific value were 3281–5790 kcal/kg, while the higher calorific value varied in the range 590–5880 kcal/kg
- in the case of ash, there was quite a wide variation in the limits of its oxide chemical composition

Based on the complex characterization of the collected waste samples, and considering the wide range of variation in the values determined for each characteristic presented, it can be concluded that the deposited material was not homogeneous.

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