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MUNICIPAL BIODEGRADABLE ORGANIC WASTE COMPOSTING

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Introduction

The storage of biodegradable waste has harmful effects on the environment (methane and greenhouse gas emissions thus contributing to global warming) and on human health. Biodegradable waste contributes significantly to the production of concentrated leachates, contextually biotoxic, requiring complex and expensive treatment technologies. That is why the Waste Storage Directive imposed a phased reduction schedule of up to 65% of the total (by weight) of municipal biodegradable waste produced. According to the data found in the National Waste Management Strategy 2014-2020, the percentage of waste eliminated through storage was 99% in 2013 while the National Waste Management Plan identified 71% of total waste eliminated through storage at the level of 2014. Of the total amount of waste generated (PNGD,2014) of 4956075 tons, approx. 58% is bio-waste, suitable for composting. In order to increase the degree of recovery and valorization of waste, it is necessary to effectively address the fraction of biodegradable organic waste through innovative treatment technologies, such as composting as an optimal method of processing biodegradable waste in order reduce the percentage corresponding to their storage.

Materials and methods

Starting from the availability of biodegradable waste types at the level of CMID Balteni, composting recipes and the initiation of composting mixtures are directly dependent on the type and quantity of biodegradable organic fractions collected at the source, the creation of optimal recipes being influenced by their availability. The industrial scale composting pilot (approx. 60 m^3) was initiated near the storage area of the active cell. The industrial composting pilot was performed on a mixture of green wastes resulting from park landscaping (Slatina) and street cleaning (without the addition of wet fraction), and biodegradable fraction processed by pre-sorting at CMID Balteni (part of the plastic waste were kept as bodies of structure/looseness into the composting pile). The pilot was seeded with approx. 3 m^3 compost previously obtained. The operation consisted mainly in aerating the composting pile, mechanically, by rearranging with the front loader. The temperature and humidity were monitored (periodic corrections were made) and compost samples were collected for analysis. Duration of composting process: approx. 6 months.

Results and conclusions

The compost sample obtained from biodegradable organic waste at the pilot level (S1) was analytically evaluated compared to a sample of organic fertilizer based on cattle manure (S2), a sample of industrial garden compost (obtained from green waste) (S3), a universal soil sample (peat + manure compost) commercially available (S4) and a universal soil sample (black peat + tree bark humus) also commercially available (S5) (Figure 1 and Figure 2).

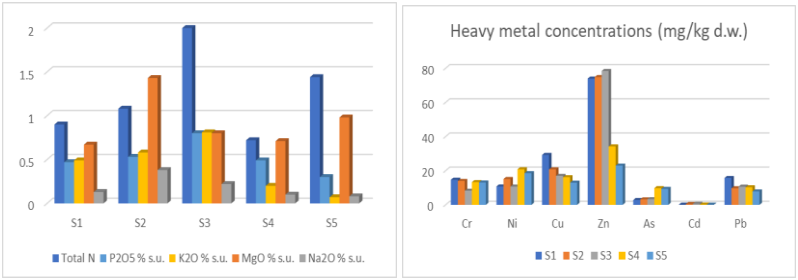

Fig.1.Agro-biochemical characteristics and heavy metal content of studied composts

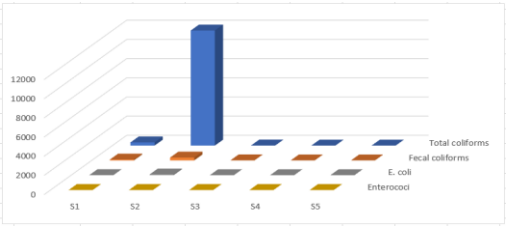

Fig.2. Microbial quality of studied composts (CFU/g d.w.)

Composting technology can be successfully used for the post-treatment of municipal biodegradable organic waste alone or mixed with other biodegradable fractions resulting from landscaping, agricultural, or food industry. The technology allows reducing the amount of biodegradable organic waste by approximately 40-50% and reusing it in the form of a compost type product with potential applications in agriculture. The main impediment identified in this study was the low level/insufficient separate source collection of the biodegradables. On the other hand, the presence of inert bodies such as PET bottles, plastics, etc., gave structure to the composting pile and favored the gas exchange during the active composting stage. The agrochemical quality of the product obtained through this technology is close to that of similar products commercially available such as compost/organic fertilizer or flower soil (peat mixture + tree bark). The poor microbiological quality urges for the need of a physical disinfection stage for the reduction of pathogen and potential pathogen bacteria.

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