The volatile fraction of green food waste

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The separation of domestic waste at source is considered an established recycle trend. Nevertheless, kitchen organic waste can potentially become a source of malodorous. The decomposition of green food waste is a time dependent dynamic procedure affected mainly by temperature, relative humidity and aeration. The latter, prevents anaerobic conditions in the organic waste that could promote the formation of malodorous compounds (e.g. sulfur volatiles). The aim of the present study was to monitor the production of volatile organic compounds (VOCs) for 15 days in modified plastic household waste bins, under three different aeration scenarios: without aeration, with aeration (diffusion), and intermittently enforced aeration. In this context, Solid Phase Microextraction-Gas Chromatography-Mass Spectrometry (SPME-GC-MS) analysis was employed. Other important parameters of short storing and composting bioprocess were additionally monitored (e.g. CO_2, O_2, H_2S, CH_4, NH_3, % RH, waste temperatures) using portable sensors. The most frequent chemical classes of VOCs, presenting over 50% appearance in all analyzed samples, were terpenes, sulfides, aromatics, alkanes, ketones, esters and alcohols. These were produced as a result of waste volatilization, decomposition and action of microorganisms (microbial VOCs, MVOCs). The release of gaseous emissions was notable from the very early stages. Despite the uniformity of results, the important role of terpenes and, more specifically, that of di-limonene was noticed. Aeration of waste bins affected the volatilization process resulting in higher profiles of low to medium molecular weight VOCs. Terpenes in combination with certain VOCs play an important role in the perception of compost odor.

References:

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