Marketable high performance compact technologies for the abatement of VOCs in EU waste treatment plants, decreasing CO_2 emissions and energy consumption.

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Abstract

In the EU, 570 mechanical biological waste treatment (MBT) plants were operating in 2017. This number will increase by 120 new facilities in 2025, with an expected total emission of non-methane volatile organic compounds (NMVOCs) of 3,900,000 tons/year. Additionally, 2,926,000 tons of CO_2 were emitted in 2020 from the waste management sector. Current VOCs treatment technologies in MBT plants, thermal oxidizers and biofilters, show high costs, energy consumption and CO_2 footprint. The LIFE ABATE project (LIFE22-ENV-ES-LIFE-ABATE/101113838) aims to significantly reduce VOC and odour emissions, energy requirements (saving natural gas and electricity) and

exploitation costs from MBT plants. To this aim, an innovative solution consisting of a pre-concentration stage in a zeolites rotoconcentrator followed by the biological treatment of the concentrated VOC stream in a novel two-phase biotrickling filter will be tested in a demo plant treating 20,000 m^3/h of real gas emission. Afterwards, the CO_2 produced will be valorized in a greenhouse to promote the growth of crops, avoiding its release into the atmosphere. The solution will be validated at an industrial scale in the MBT plant Ecoparc 3 (Barcelona) and replicated in Las Dehesas (Madrid). The developed technology will not only be applicable to EU MBT plants but also to other industrial sectors.

The preliminary results of the project and the main outcomes from the life cycle analysis of the proposed solutions will be presented at the conference.