

Start-up and operation of two large-scale biofilters installed at a municipal solid waste treatment plant

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Municipal solid waste management is a ubiquitous problem of large metropolis. The space restrictions for landfill expansion or construction have made the composting of organic matter and recycling of valuable waste components a priority. A novel municipal waste treatment plant comprising (i) mechanical separation units to segregate the recycling materials from the collected waste bags and (ii) fermentation towers to produce biogas from the organic matter (converted later into compost), has been implemented in the north of Portugal to reduce the waste volume destined for landfill disposal. Consequently, odor emissions are associated with these activities and have to be controlled.

Two biofilters have been implemented at this waste treatment facility to treat odors originating from (i) the enclosed building where the waste is received and mechanically separated, and (ii) the enclosed building where the sludge retrieved from the composting process is dried and matured into compost. These biofilters were filled with a mixture of wood-chips and compost and were exposed to different pollutant concentrations and operating conditions. The start-up was monitored and compared. The effects that operation conditions, such as periods of drought and seasonal changes, had on the biofilter performance were also investigated. Humidification strategies for maintaining adequate media moisture were experimented. The microbial communities present in the media, examined through biomolecular techniques, revealed that different communities had established in each biofilter. The results obtained demonstrate the potential of biofilters to mitigate odor emissions at waste treatment plants.