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Quantification of Hydrogen Sulfide and Methyl Mercaptan in Air Samples from a Waste Management Facilities

Authors : R. F. Vieira, S. A. Figueiredo, O. M. Freitas, V. F. Domingues, C. Delerue-Matos

Abstract : The presence of sulphur compounds like hydrogen sulphide and mercaptans is one of the reasons for waste-water treatment and waste management being associated with odour emissions. In this context having a quantifying method for these compounds helps in the optimization of treatment with the goal of their elimination, namely biofiltration processes. The aim of this study was the development of a method for quantification of odorous gases in waste treatment plants air samples. A method based on head space solid phase microextraction (HS-SPME) coupled with gas chromatography - flame photometric detector (GC-FPD) was used to analyse H2S and Metil Mercaptan (MM). The extraction was carried out with a 75-µm Carboxen-polydimethylsiloxane fiber coating at 22 ºC for 20 min, and analysed by a GC 2010 Plus A from Shimadzu with a sulphur filter detector: splitless mode (0.3 min), the column temperature program was from 60 ºC, increased by 15 ºC/min to 100 ºC (2 min). The injector temperature was held at 250 ºC, and the detector at 260 ºC. For calibration curve a gas diluter equipment (digital Hovagas G2 - Multi Component Gas Mixer) was used to do the standards. This unit had two input connections, one for a stream of the dilute gas and another for a stream of nitrogen and an output connected to a glass bulb. A 40 ppm H2S and a 50 ppm MM cylinders were used. The equipment was programmed to the selected concentration, and it automatically carried out the dilution to the glass bulb. The mixture was left flowing through the glass bulb for 5 min and then the extremities were closed. This method allowed the calibration between 1-20 ppm for H2S and 0.02-0.1 ppm and 1-3.5 ppm for MM. Several quantifications of air samples from inlet and outlet of a biofilter operating in a waste management facility in the north of Portugal allowed the evaluation the biofilters performance.

Keywords : biofiltration, hydrogen sulphide, mercaptans, quantification
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