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## **Improvement in 8h-Sampling Rate Assessment Considering Meteorological Parameters Variability for Biogas VOC Passive Measurements in the Surroundings of a French Landfill**

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### **ABSTRACT**

Passive sampling technology has been extensively used for long-term VOC atmospheric concentrations monitoring. Its performances regarding the short-term measurements and related to VOC from biogas were evaluated in this work: laboratory scale experiments have been conducted in order to check the suitability of Radiello® diffusive samplers for the assessment of 8 hours-VOC levels in highly changeable meteorological conditions; in a second step a short pilot field campaign was implemented in the vicinity of a West-French landfill. First of all, it was assessed that amongst a diversified list of 16 characteristic compounds from biogas, mercaptans, some halogenated, oxygenated compounds and terpenes couldn't be measured accurately by this passive technique either because they are not captured by the sorbent or they are not quantitatively desorbed in the chosen mediated analytical conditions. Moreover, it has been confirmed that sampling rates (SR) related to isopentane, THF, cyclohexane, toluene, p-xylene and n-decane are influenced by environmental factors: the main influence concerns the wind speed. From  $2\text{m}\cdot\text{s}^{-1}$ , when the velocity increases of  $1\text{m}\cdot\text{s}^{-1}$ , the SR increases from 12 to 32 % depending of the COV (considering a linear dependence between 2 and  $7\text{m}\cdot\text{s}^{-1}$ ). Humidity has no effect on SR, and temperature influence is rather limited to less than 3% per degree. A comprehensive uncertainty estimation, including uncertainties linked to meteorological changes, has led to global relative uncertainties comprise between 18 % and 54% from one VOC to another: a quite high value comparatively to those obtained without consider meteorological condition influences. To illustrate our results, targeted VOC were quantified in the field, on a single day: concentrations range between LD to  $3\text{ }\mu\text{g}\cdot\text{m}^{-3}$ : relatively very low concentrations compared to those usually reported by literature.

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