



Air Pollution

**ABIOTIC AND BIOTIC MITIGATION OF VOLATILE METHYL
SILOXANES IN ANAEROBIC GAS-PHASE BIOMATRICES**

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Abstract

This paper presents preliminary results of a batch-scale study assessing the contribution of the multiple phenomena involved in siloxane removal in three-phase biomatrices. Batch scale experiments were undertaken in shaken flasks containing acclimatised culture medium, solid media and siloxane vapours (octamethylcyclotetrasiloxane and decamethylcyclopentasiloxane, respectively) under anaerobic gas-phase conditions. Abiotic and biotic phenomena, considered to be possible siloxane removal mechanisms, were monitored via the silicon-mass balance. The maximum siloxane removal efficiency in the gas-phase reached 44-82%, depending on the type of solid media and the siloxane compound tested. The dominant removal mechanism was abiotic in all cases. The formation of colloidal siloxane dispersions was observed, simultaneous with siloxane adsorption on solid media and some biological degradation. These experimental observations may be beneficial for the development of new methods for siloxane removal from gas fluxes, particularly biogas.

Key words: abiotic, biodegradation, biotic, decamethylcyclopentasiloxane, octamethylcyclotetrasiloxane

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