

Analysis of volatile organic compounds

Entombed victims under the ruins of collapsed buildings, because of natural or man-made disasters, patiently wait for help in order to be identified, detected, safely extricated and finally saved by urban search rescue (USAR) teams. This is actually a fight against time, since as time passes, the possibility of finding survivors diminishes. Even then, the recovery and identification of dead bodies is considered important for ethical, social, religious and public health reasons; this is especially true for modern societies. In Europe, ethical guidelines do not allow the employ of human corpses in simulating collapse building scenarios and thus first responders are using synthetic chemical mixtures or pig carcasses for training their canines and personnel.



Towards this direction, a field experiment took place in an USAR field terrain in Athens, aiming on the identification and detection of volatile organic compounds (VOCs) released by pig carcasses (acting as surrogated human models) during their early decomposition stage. Dozens of small, volatile, organic molecules were released soon after death creating the characteristic bad smell. Therefore, for decoding the decay odor, air samples were taken using sorbent traps and analyzed on a thermal desorption coupled to comprehensive two-dimensional gas chromatography with time-of-flight mass spectrometry (TD-GC × GC-TOF MS). The sensitivity and separation power of TD-GC × GC-TOF MS resulted in the identification of hundreds of VOCs, contributing in resolving the chemical puzzle of scent of death. The research output of such studies include, among others, the location of clandestine graves, the detection of victims of natural or man-made disasters, the improvement of canines' training, the revealing of etiology of death, the identification of post mortem interval. Besides, only by the funeral of human individual, closure to affected relatives is given.

Publication

[Analysis of volatile organic compounds released from the decay of surrogate human models simulating victims of collapsed buildings by thermal desorption-comprehensive two-dimensional gas chromatography-time of flight mass spectrometry.](#)

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