

## **Forensic GCxGC-TOFMS study of cadaveric volatile organic compounds (VOCs) released by buried decaying pig carcasses.**

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Thanatochemistry, also named “chemistry of death”, is poorly studied and the available information regarding VOCs released after death are rather limited. Numerous applications would however benefit from a better understanding of the olfactive signature of a human or animal corpse. The cadaveric VOCs find applications in forensic sciences area such as training of cadaver dogs, or even development of cadaveric material detection devices.

Comprehensive two-dimensional gas chromatography (GCxGC) coupled to time-of-flight mass spectrometry (TOFMS) is used to study cadaveric VOCs released by buried decaying pig carcasses. The aim of the study is to improve the isolation, separation, and identification of VOCs emitted by the corpse under decomposition in various layers of the surrounding soil.

Samples were made of soils (50g of gravesoil) collected at various depth and localization from the carcass. Reference soils were also collected. Soils were stored at -80°C until closed vessel dynamic sampling for 1h using homemade 60mg SuperQ<sup>TM</sup> cartridges. Cartridges were desorbed using 200µl of diethyl ether.

A previous study [1] using GC-MS for cadaveric VOC identification in different biotopes reported on around 100 analytes of interest including acids, ketones, aldehydes, esters, alcohols, nitrogen compounds, sulfur compounds, cyclic and non-cyclic hydrocarbons, as well as halogenated compounds. In the present study, hundreds of peaks are detected for soil samples. The data processing challenge consists in specifically attribute peaks to the smell of death and identify analytes of interest. Data mining and comparison tools are used in qualitative and semi-quantitative approach to try to enlarge the list of cadaveric VOCs.

[1] J. Dekeirsschieter, F.J. Verheggen, M. Gohy, F. Hubrecht, L. Bourguignon, G. Lognay, E. Haubruge, *Forensic Science International* 189 (2009) 46-53.