**Passive sampling and GCxGC-TOFMS with soft electron ionisation for enhanced screening of environmental pollutants in complex matrices**

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Two-dimensional gas chromatography with time-of-flight mass spectrometry (GCxGC-TOFMS) can provide highly sensitive detection and confident mass spectral identification of pollutants within complex environmental extracts.

Nevertheless, the identification of individual compounds may be hindered by weak molecular ions or when similar mass spectral characteristics are evident across entire chemical classes. Select-eV ion source technology overcomes this problem by allowing both hard and soft electron ionisation with no inherent loss in sensitivity. Select-eV provides enhanced molecular ions whilst retaining structurally-significant fragment ions, delivering both confident compound identification and increased selectivity. We show the potential of this technology for the analysis of both target pollutants and unknown chemicals in two different, complex extracts.

The routine monitoring of water quality is now a requirement of environmental legislation, such as the EU’s Water Framework Directive. Often the cause of a poor water quality status is unknown and extensive investigative monitoring is needed to determine what chemical maybe responsible. Passive sampling devices (e.g. semi-permeable membrane devices (SPMD), LDPE and silicone rubber) are often used for this purpose. The samplers were deployed for several weeks in a polluted river course in the UK to effectively sequester large volumes of water and provide a concentrated, representative extract for analysis by GCxGC-TOFMS with Select-eV.

In a second study, explanted silicone breast prostheses obtained from patients over a wide age range were collected. Silicone oils in the prosthesis extracts were removed using a multi-step extraction procedure and the resultant extracts were analysed by GCxGC-TOFMS with Select-eV. This novel approach aims to better estimate the overall body burden of bio-accumulative substances and how this changes over time of exposure.

This presentation shows the suitability of this novel analytical platform for environmental investigations, using both target-focused studies as well as non-targeted routines for screening for the presence of emerging contaminants.