

## **Comprehensive Two-Dimensional Gas Chromatography Time of Flight Mass Spectrometry (GCxGC-TOFMS) for Environmental Forensic Investigations in Developing Countries.**

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Comprehensive two dimensional gas chromatography time of flight mass spectrometry is an extremely powerful tool for the screening of toxic waste samples. In this presentation samples collected from a toxic waste disposal site in South Africa were investigated to determine the efficiency of the incineration process. Using the technique it is possible to screen for numerous different pollutant classes *in one analytical run*. This is not possible with scanning mass spectrometers which rely on selected ion monitoring (SIM) to achieve the sensitivity and selectivity required for this type of analysis.

Among the different classes of pollutants confirmed in the sample were dibenzo-*p*-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), dioxin-like polychlorinated biphenyl compounds (DL-PCBs), polynuclear aromatic hydrocarbons (PAHs), polychlorinated naphthalenes (PCNs), terphenyls and chlorinated terphenyls, chlorinated furans, chlorinated pyrenes as well as numerous other chlorinated and brominated aromatics.

In addition, *in the same analytical run*, it was possible to quantify the PCDDs, PCDFs and DL-PCBs. The results obtained for these quantitations were compared with those obtained using accepted technology for PCDD analysis (high resolution mass spectrometry [HRMS]), and excellent agreement was obtained. It was also possible to achieve the requirements of EPA Method 1613 for the quantitative analysis of PCDDs and PCDFs.