RAPID DETECTION OF POLYCYCLIC ALIPHATIC HYDROCARBONS IN COMPLEX ORGANIC MATRICES USING ANALYTICAL PYROLYSIS (Py-GC/MS)

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Analytical pyrolisis (Py-GC/MS) is a fast and reproducible technique widely used in the structural characterization of organic matrices. Usual analytical methods for the study of polycyclic aliphatic hydrocarbons (PAHs) involve more or less complex and time-consuming sample preparation and extraction steeps, often with the use of high quantities of organic solvents. In order to illustrate the potential of the technique for a rapid qualitative assessment of PAHs, Py-GC/MS is used here giving results of PAHs assemblages directly detected in a number of extremely complex organic matrices.

Homogenised samples (1–5 mg) are placed in a double-shot pyrolyzer (Frontier Laboratories, model 2020i) attached to an Agilent 6890N GC-MS. The initial temperature was 100 °C that was increased at 20 °C min^{-1} to a final pyrolysis temperature of 500 °C for 1 min. The GC instrument was equipped with a DB5MS (J&W Scientific; 30 m × 250 µm × 0.25 µm film thickness) column; oven temperature programme was: 50 °C (1 min) to 100 °C at 30°C min^{-1}, then to 300 °C at 20 °C min^{-1} (held 10 min). The carrier gas was He at a controlled flow of 1 ml min^{-1}. The detector was an Agilent 5973 mass selective detector and mass spectra were acquired with 70 eV ionizing energy. Compound assignment was achieved via extracting ion chromatograms (XIC) for selected ions, low resolution mass spectra and comparison with published and stored (NIST and Wiley libraries).

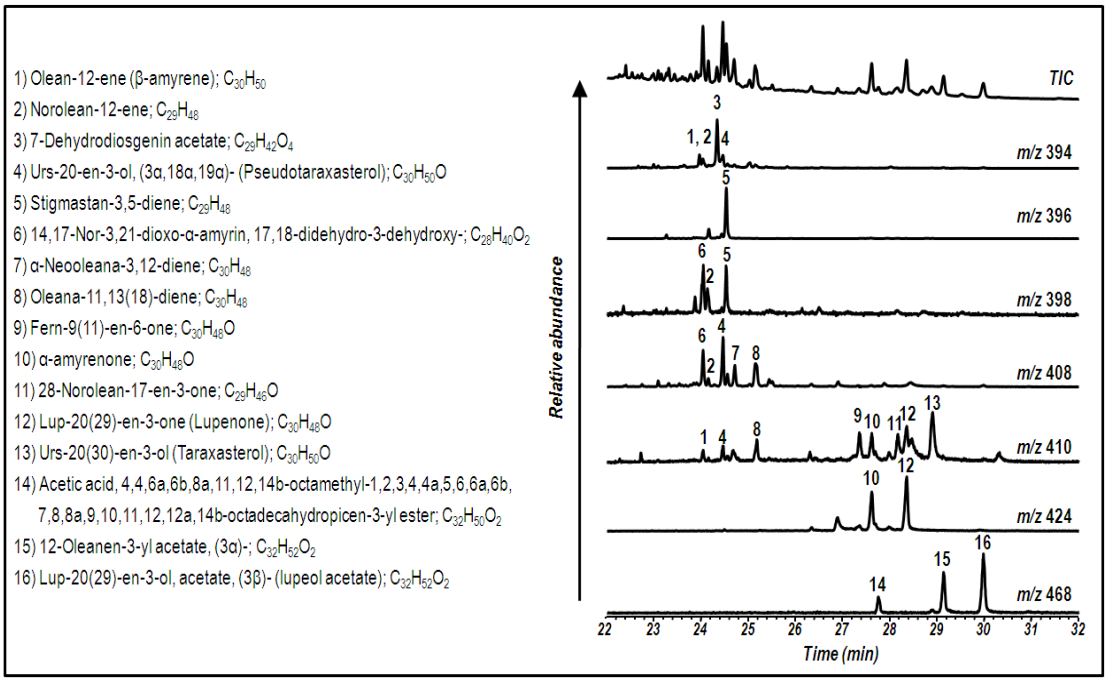

Figure: Partial total ion current (TIC) and extracted ion Py-GC/MS chromatograms with a tentative identification of polycyclic aliphatic hydrocarbons. Example from an aleppo pine (*Pinus halepensis*) forest topsoil.

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