Hot Cell MIMS: Direct analysis of semi-VOCs liberated from practically any type of solid sample

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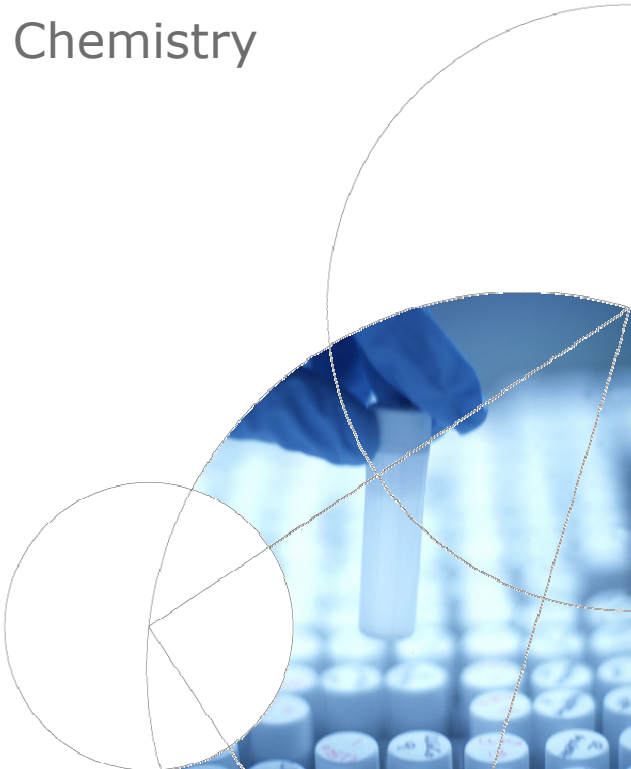
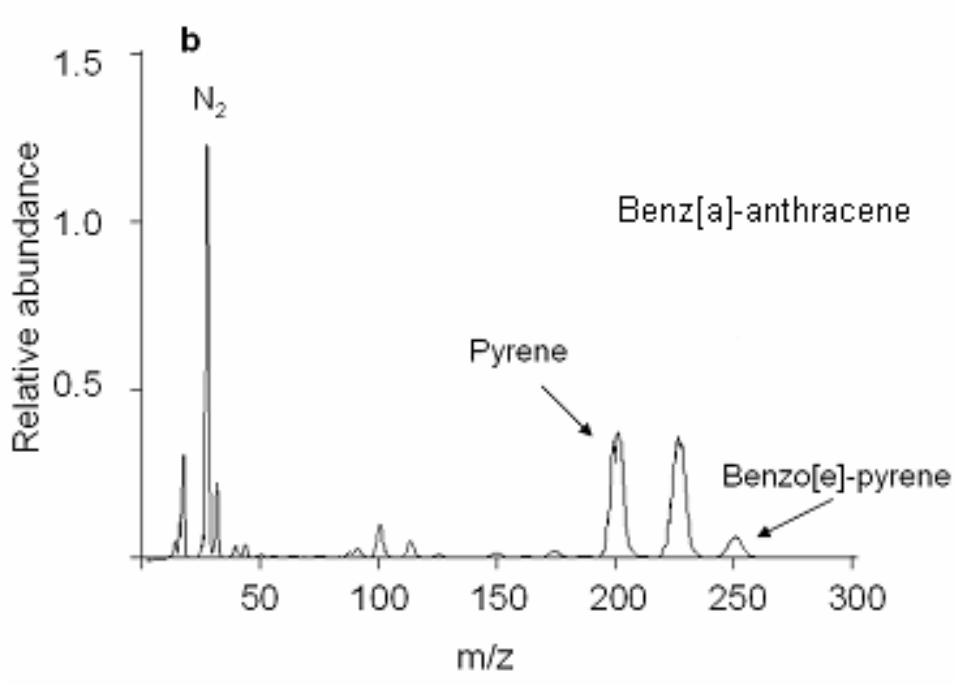


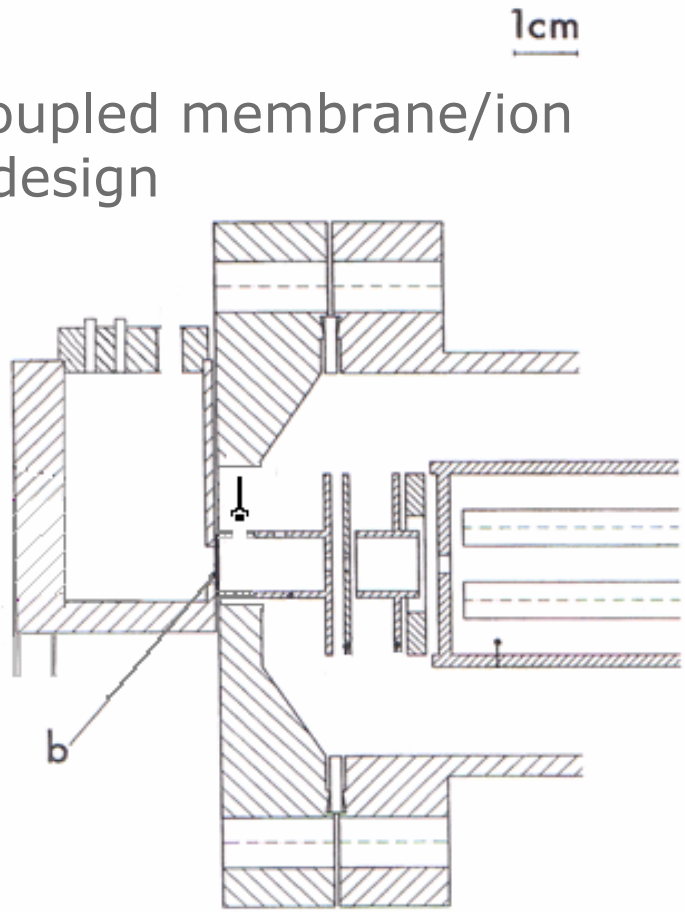
HEMS - 2007

PAH analysis directly from soil



Hot cell MIMS: Optimized design

Close coupled membrane/ion source design

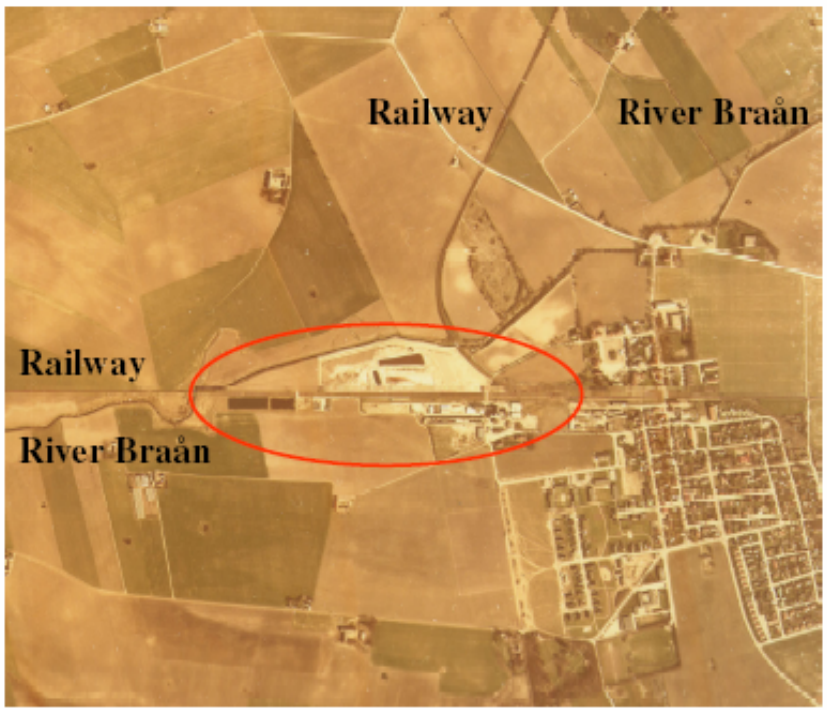


A hot cell design

Lauritsen, Jensen, Nielsen. Rapid Commun. Mass Spectrom. 2008, 22, 2334.

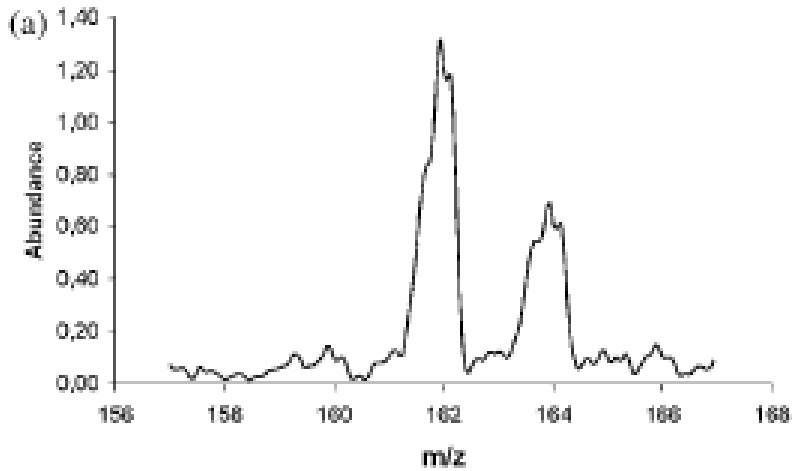
On-site analysis of contaminants

Ariel photo 1978 over BT Kemi site

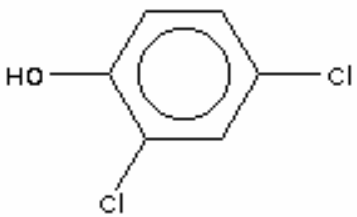


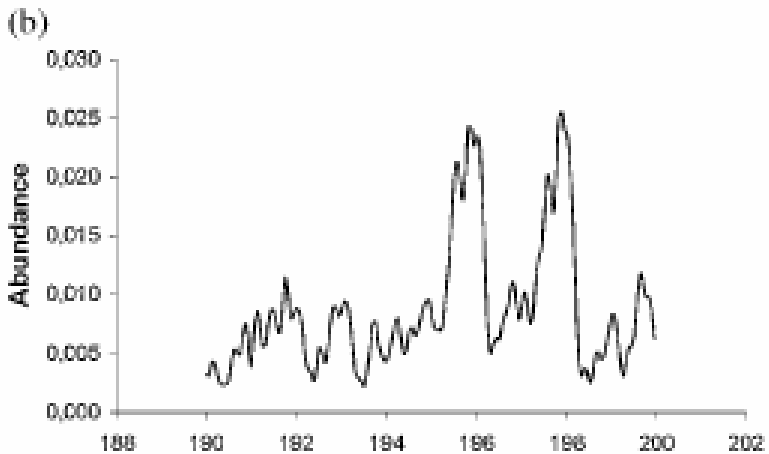
Waste sampling. Half masks was needed because of the odour.

Mass spectra of contaminated soil

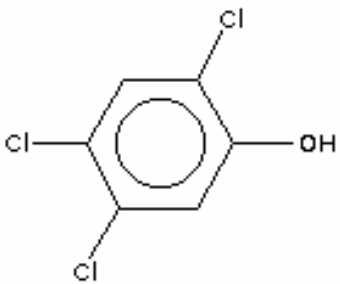


2,4-dichlorophenol



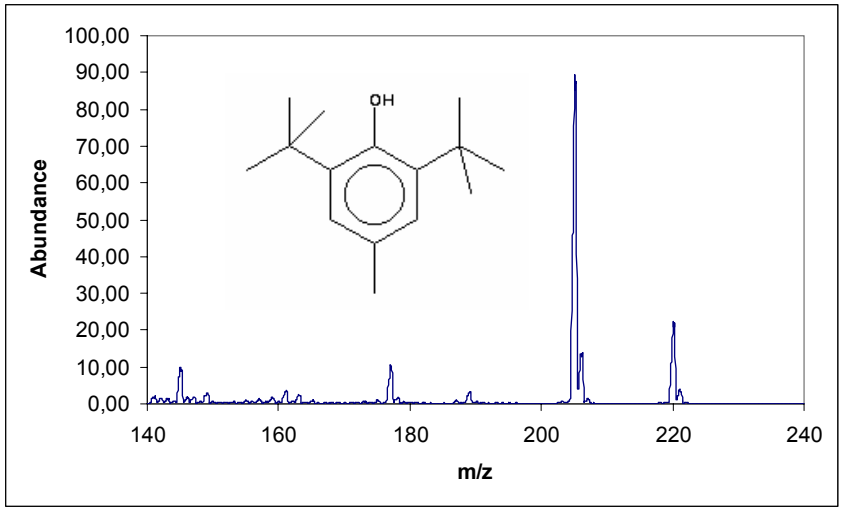


2,4,5-trichlorophenol

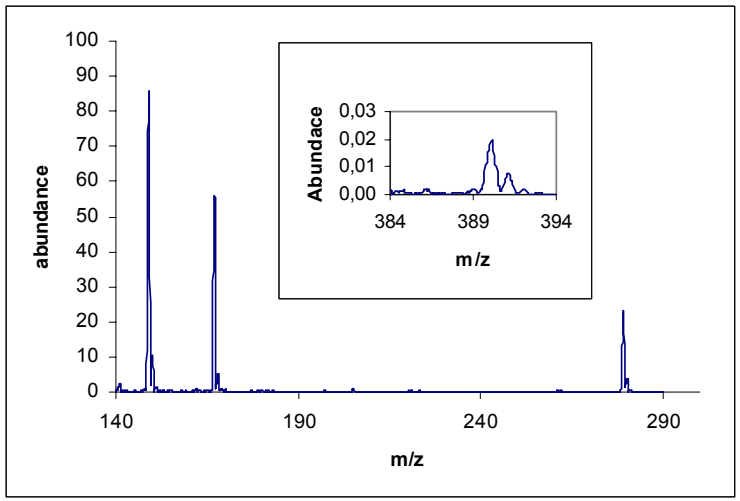


Direct analysis of plastic materials

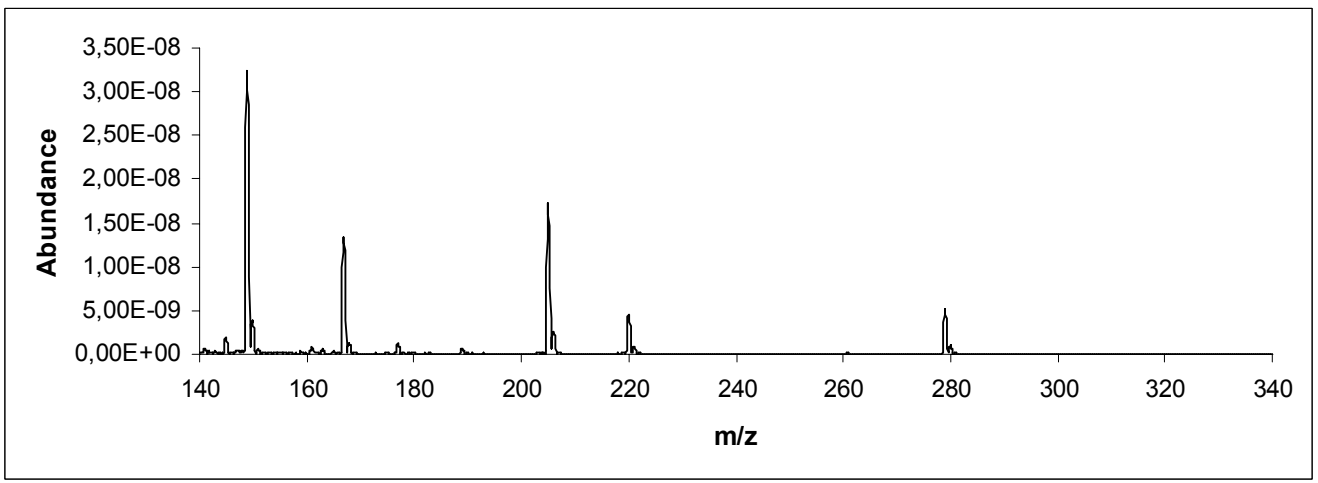
Vacuum tube of rubber



Soft PVC tube

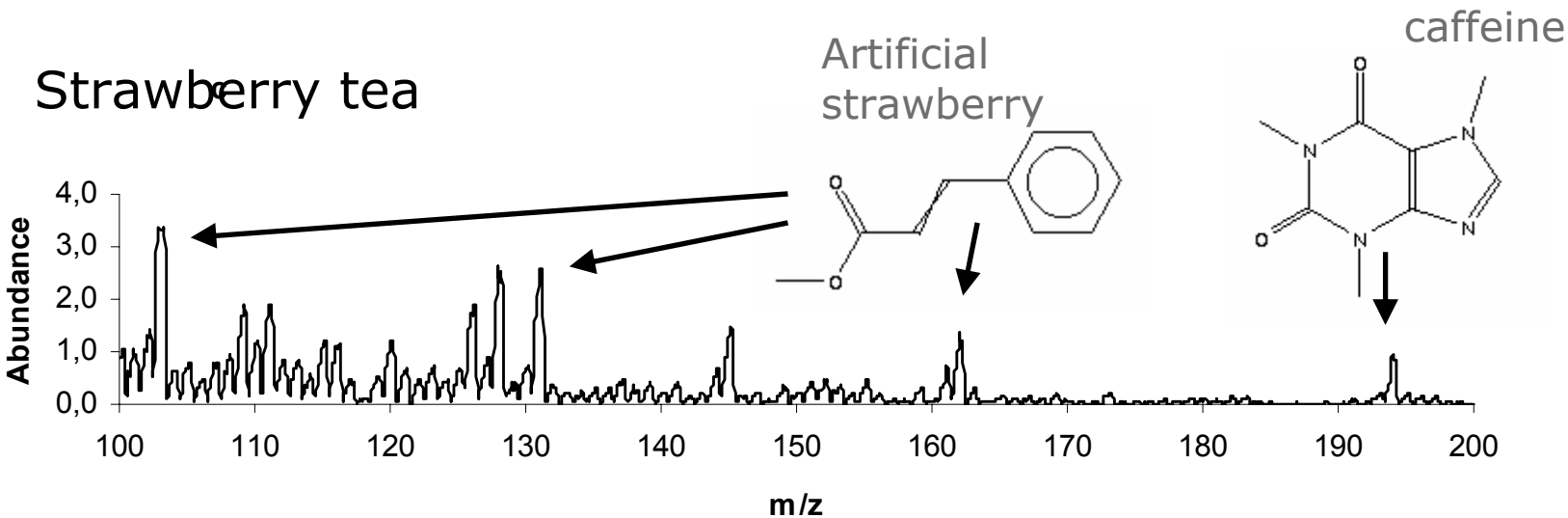


Plastic bag for medical infusion at hospitals

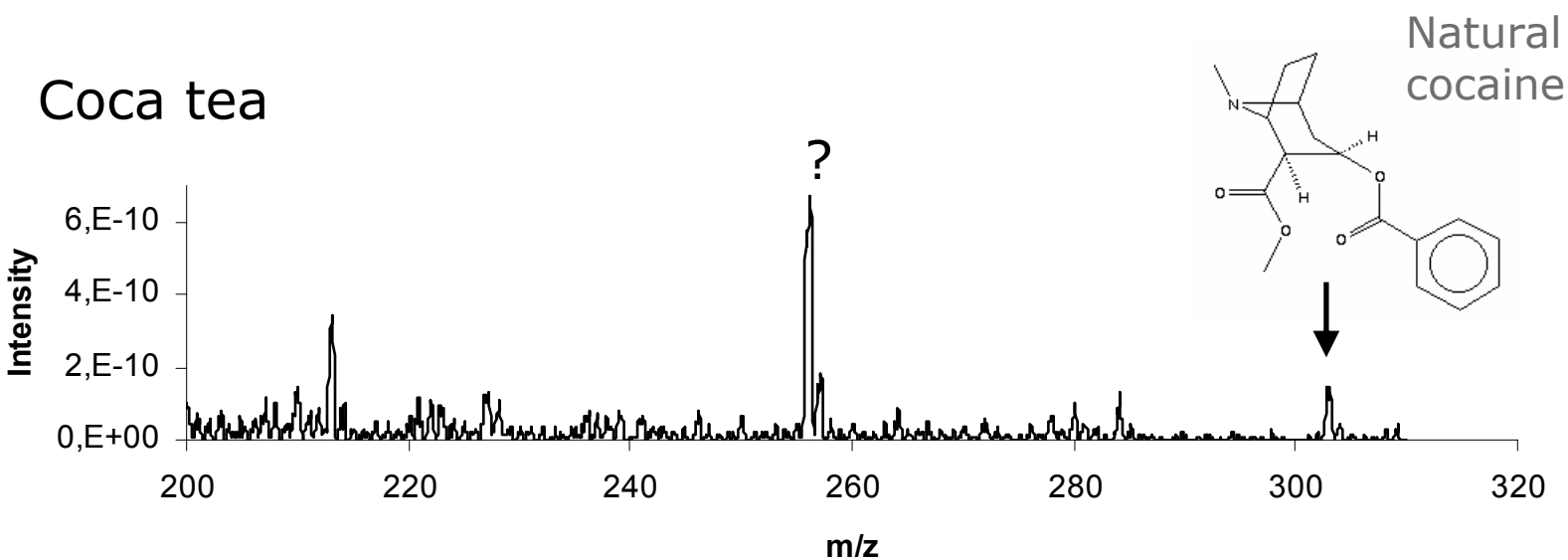


Analysis of plant materials

Strawberry tea

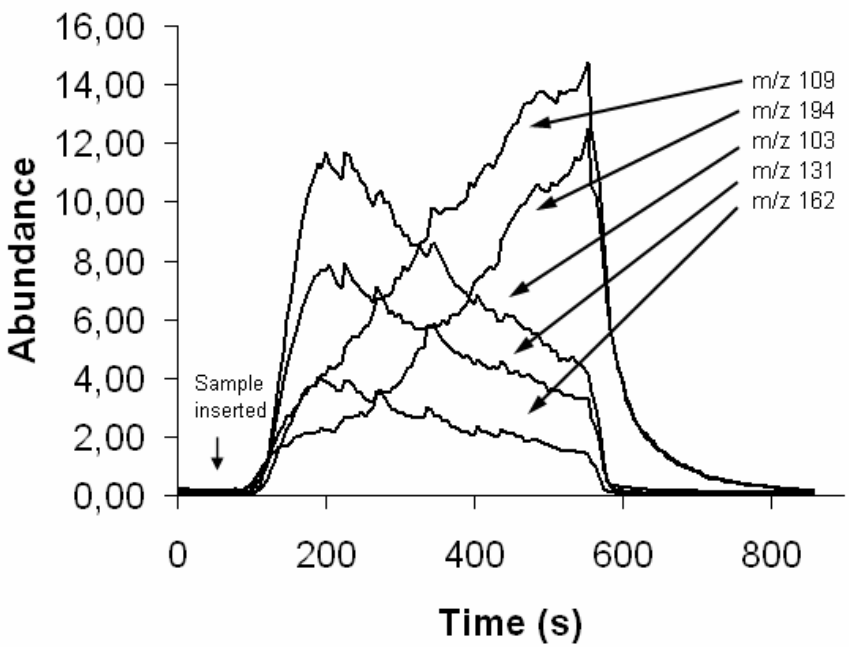


Coca tea

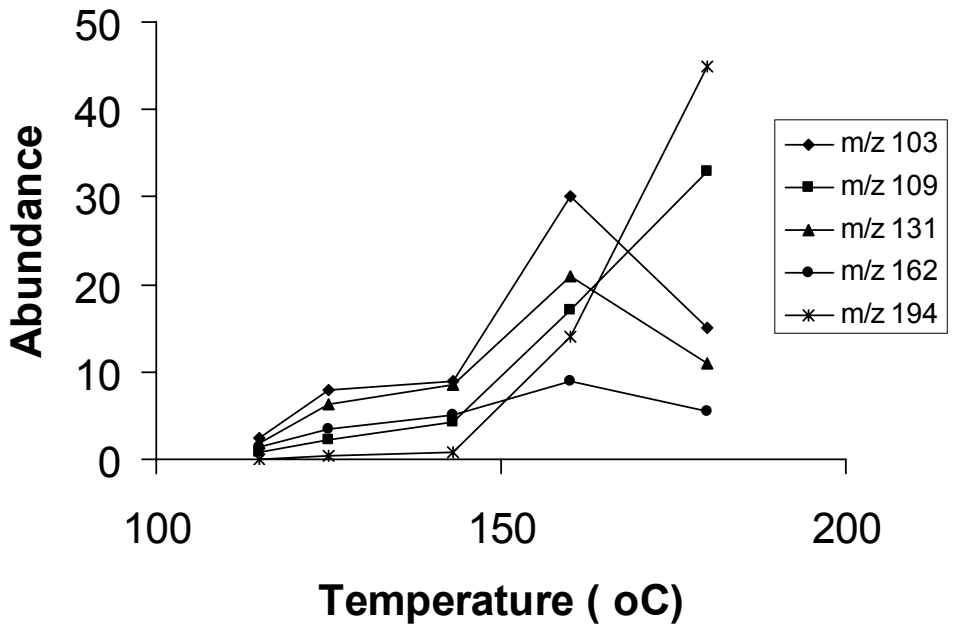


Selectivity in hot cell MIMS without MS/MS

Dynamics



Cell temperature

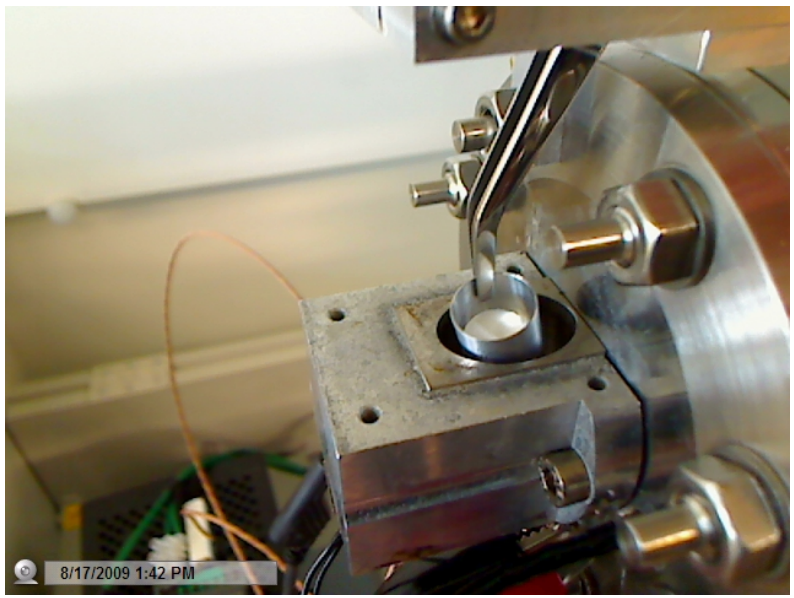


Sample: Strawberry tea

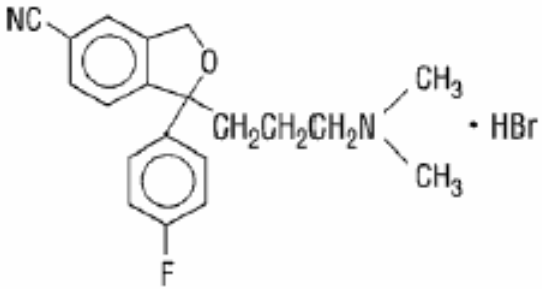
- **Caffeine (m/z 109 and 194)**
- **Methylcinnamic acid (m/z 103, 131 and 162)**

Direct analysis of tablets

Sample cell and sample vial for direct analysis of tablets



Citalopramhydrobromide (40 mg)



MW: 405

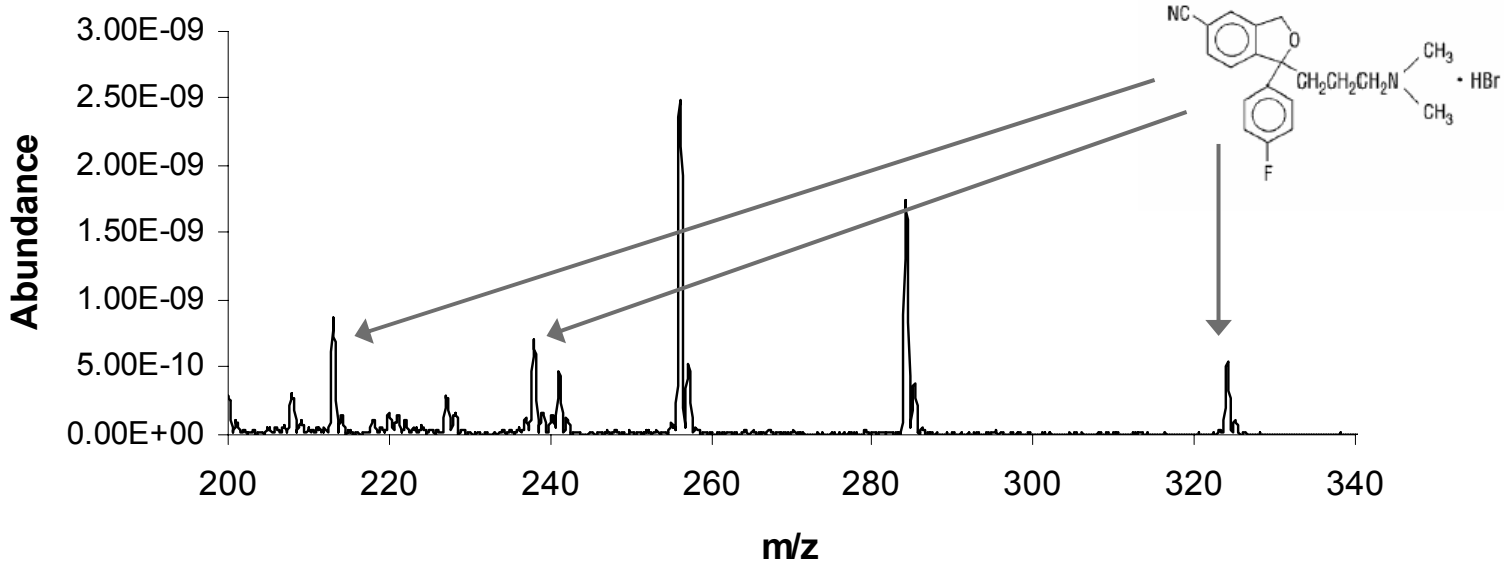
Tablet content (fillers):

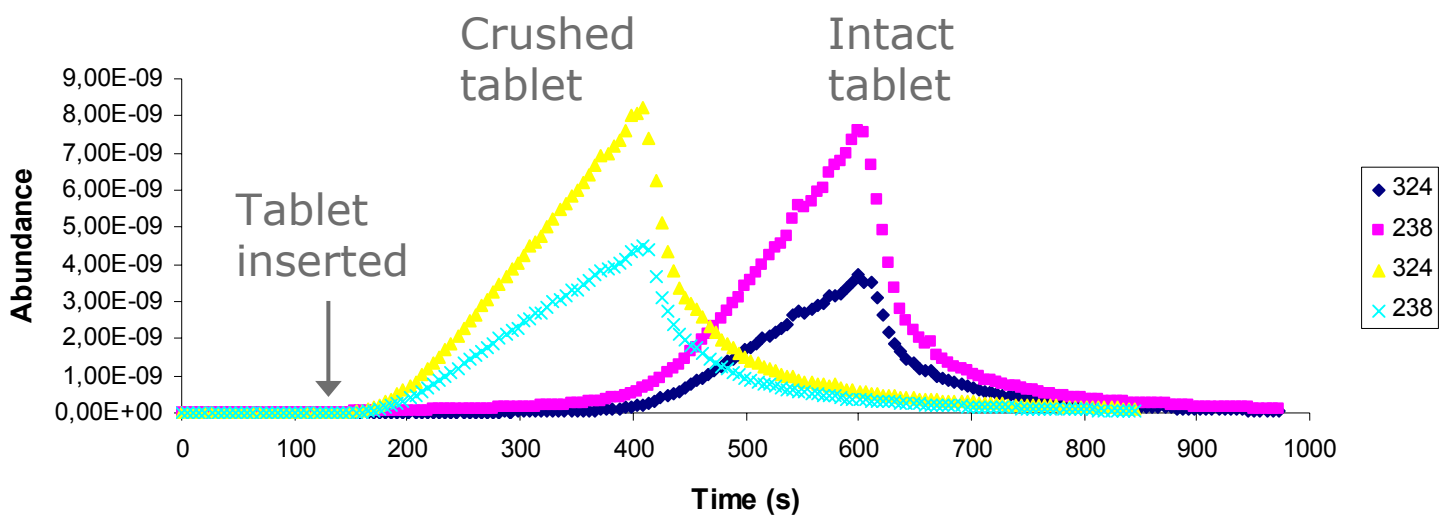
Cellulose, glycerol, corn starch, lactose monohydrate, magnesium stearate, copolyvidone, sodium cross caramellose.

Surface coating:

Macrogol 6000 (polyethylene glycol), hypromellose, titanium dioxide

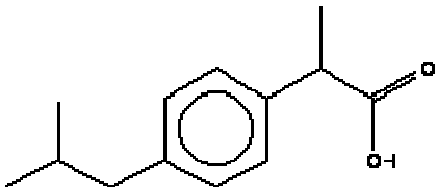
Citalopram tablets



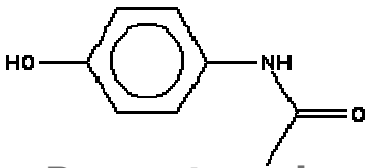


Tested tablets/powder commonly used in suicidal attempts

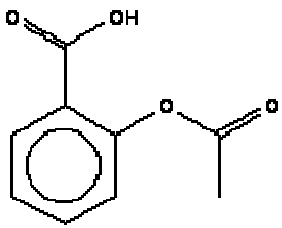
Pain killers



Ibuprofen

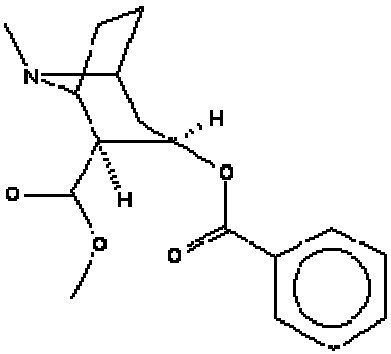


Paracetamol

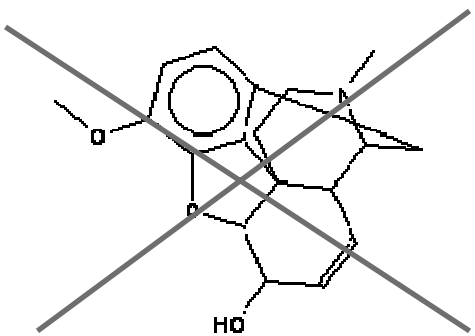


Acetyl salicylic acid

Narcotics

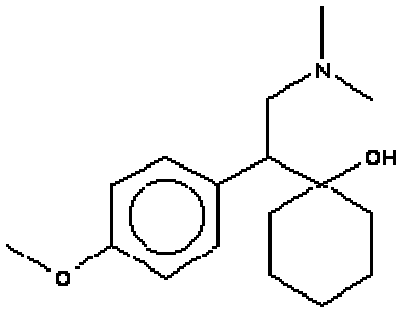


Cocaine

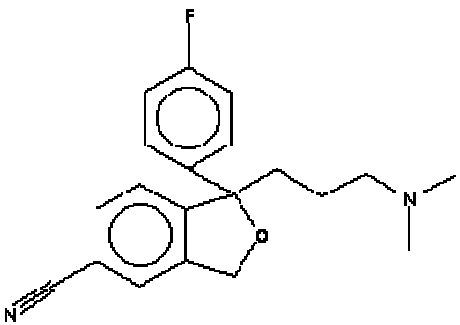


Codeine phosphate

Anti depressives



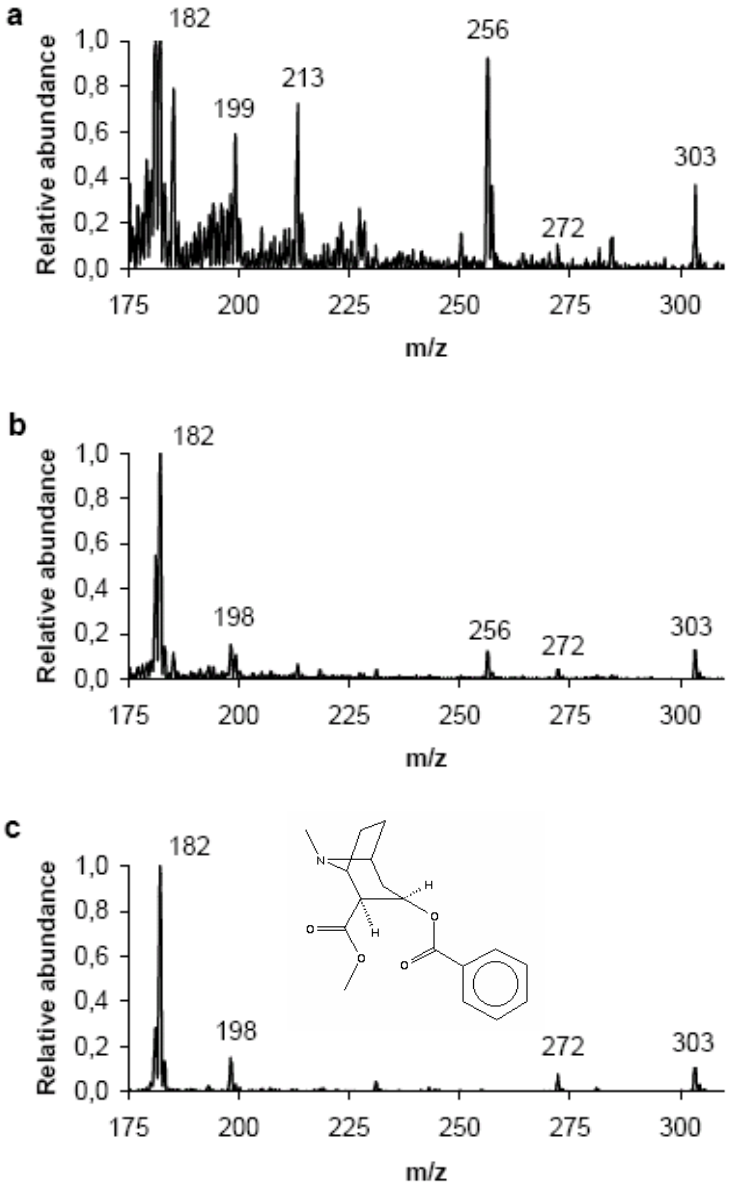
Venlafaxine



Citalopram

Quantitative analysis

Coca plant



Direct analysis of leaves

Micro extract in methanol

Cocaine standard

Chen, Xia, Pedersen-Bjergaard, Svensmark, Lauritsen. Anal. Chem. 2009, 81, 4010-4014.

Choosing a solvent

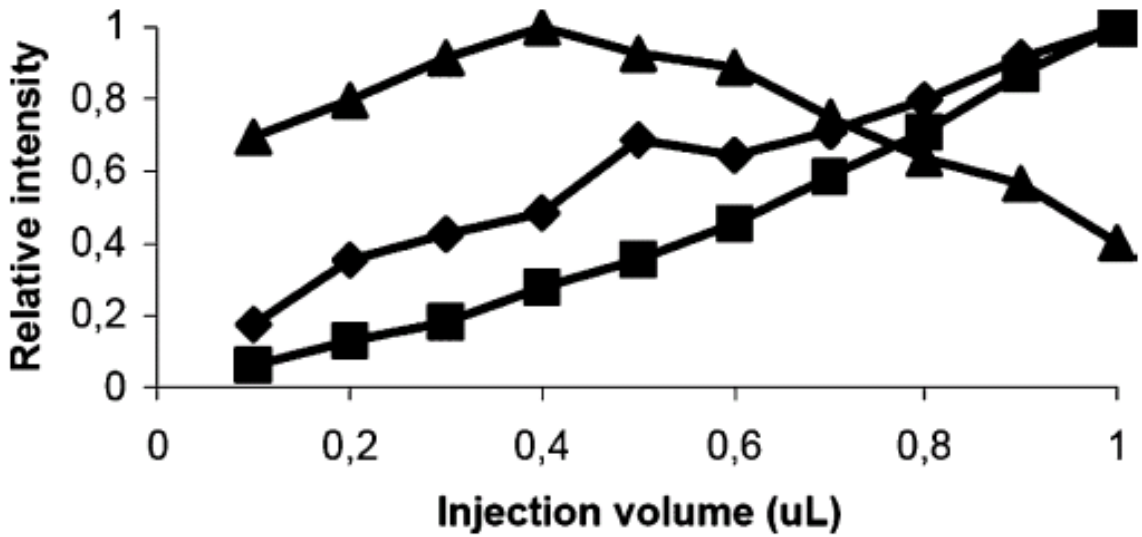


Figure 4. Recorded peak height from BHT as a function of sample volume. ♦ BHT dissolved in toluene, ■ BHT dissolved in methanol, and ▲ BHT dissolved in water. For easy comparison between the solvents each solvent series was normalized to 1 for the maximum recorded peak height.

Conclusion

With **Hot cell MIMS** it has become possible to analyse almost any solid material for its potential liberation of large hydrophobic chemicals directly and without any treatment of the sample.

Test examples:

- Plastizisers and stabilisers in plastic materials
- Active ingredients in plant materials
- Pharmaceuticals from tablets
- Contaminated soil

Hot cell MIMS is fully compatible with field portable mass spectrometers

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