



Chromatography Technical Note No AS40S

Rapid Analysis of Selected SVOCs and PAHs using the Anatune XLR8R, the Anatune Cooling Accessory and Agilent 5975 GC-MS

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Introduction

In busy laboratories, there are clear incentives to minimise the instrument runtime. This leads to faster turnaround times, greater flexibility and reduced costs. To this end, we have developed a rapid method to analyse the EPA 8270 Mega Mix Standard using the Anatune XLR8R to increase the oven ramp rate to allow fast chromatography. The instrument runtime for this method is 11.5 minutes. By using the Anatune Cooling Accessory, the cycle time (the time between two subsequent injections) is approximately 18.5 minutes.

By using the retention locking functionality of the Agilent ChemStation coupled to the 6890 GC, the ease of data analysis is improved, especially setting up the data analysis after routine maintenance has been performed that will affect the analytes' retention times e.g. column trimming or replacement. This method was retention locked upon Acenaphthene-d10 at a retention time of 5.77 minutes.

Presented here is data from the analysis of the following SVOCs and PAHs, including internal standards.

Compound List

Internal Standards:

1,4-Dichlorobenzene-d4	Naphthalene-d8
Acenaphthene-d10	Phenanthrene-d10
Chrysene-d12	Perylene-d12

SVOCs:

Aniline	Bis (2-chloroethyl) ether
1,3-Dichlorobenzene	1,4-Dichlorobenzene
2-Chlorophenol	1,2-Dichlorobenzene
Benzyl alcohol	Phenol
Bis (2-chloroisopropyl) ether	Hexachloroethane
N-nitroso-di-n-propylamine	Nitrobenzene
2-Methylphenol	Isophorone
3 & 4-Methylphenol	2-Nitrophenol
Bis (2-chloroethoxy) methane	1,2,4-Trichlorobenzene
2,4-Dimethylphenol	4-Chloroaniline
Hexachloro-1,3-butadiene	2,4-Dichlorophenol
2-Methyl-naphthalene	1-Methyl-naphthalene
Hexachlorocyclopentadiene	4-Chloro-3-methyl phenol
2-Chloronaphthalene	2,4,6-Trichlorophenol
2-Nitroaniline	1,4-Dinitrobenzene
2,4,5-Trichlorophenol	1,3-Dinitrobenzene
Dimethyl phthalate	2,6-Dinitrotoluene

1,2-Dinitrobenzene	3-Nitroaniline
2,4-Dinitrophenol	Dibenzofuran
2,4-Dinitrotoluene	2,3,4,6-Tetrachlorophenol
4-Nitrophenol	2,3,5,6-Tetrachlorophenol
4-Chlorophenylphenylether	Diethyl phthalate
4,6-Dinitro-2-methylphenol	4-Nitroaniline
Diphenylamine	Azobenzene
4-Bromophenylphenylether	Hexachlorobenzene
Pentachlorophenol	Carbazole
Di-n-butylphthalate	Benzylbutylphthalate
Bis-(2-ethylhexyl)-adipate	Bis-(2-ethylhexyl)-phthalate
Di-n-octylphthalate	

PAHs:

Naphthalene	Acenaphthylene
Acenaphthene	Fluorene
Phenanthrene	Anthracene
Fluoranthene	Pyrene
Benzo [a] anthracene	Chrysene
Benzo [b] fluoranthene	Benzo [k] fluoranthene
Benzo [a] pyrene	Indeno [1,2,3-cd] pyrene
Dibenz [a,h] anthracene	Benzo [g,h,i] perylene

Instrumentation

- Agilent 6890N Gas Chromatograph with 5975 inert MSD
- Agilent ChemStation
- GERSTEL Multi-Purpose Sampler (MPS 2) configured for liquid injection
- Anatune XLR8R
- Anatune cooling accessory



Results

Figure 1 shows a total ion chromatogram for a 1µg/mL standard.

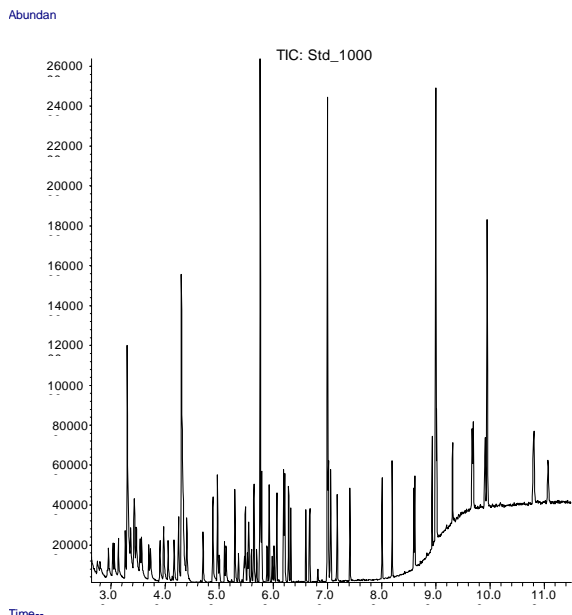


Figure 1 Total ion chromatogram for a 1µg/mL standard.

Figure 2 shows the resolution between the benzo [b] fluoranthene and the benzo [k] flouranthene. The ions shown are 252, 250 and 126.

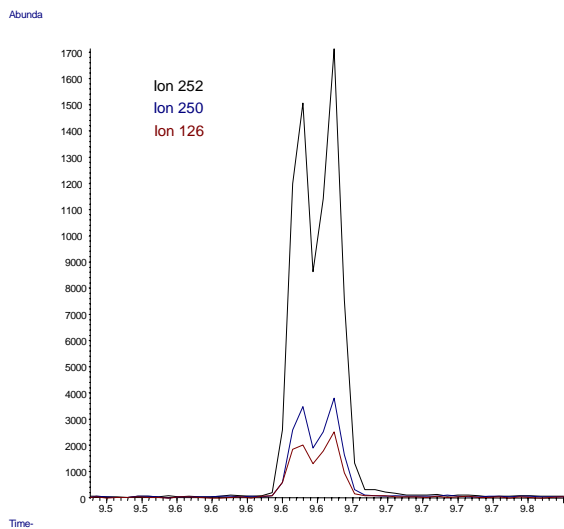


Figure 2 The resolution between the benzo [b] fluoranthene and the benzo [k] flouranthene for the 252, 250 and 126 ions.

This resolution is typical for the system at the programmed oven ramp rates. By reducing the ramp rate better resolution may be achieved, but this will be at the cost of an increase in instrument runtime.

Conclusions

This evaluation has confirmed the suitability of the Anatune XLR8R combined with the Agilent 5975 inert MSD for high-throughput SVOC analysis.

This system can thus be used as a rapid, cost effective and reliable method for the quantitation of selected SVOCs and PAHs. The instrument runtime of 11.5 minutes affords sufficient separation of all compounds analysed, significantly increasing laboratory productivity when compared with SIM GC-MS or methods using the standard Agilent 6890 oven.