CDS olutions

APPLICATIONS INFORMATION USING ADVANCED SAMPLE HANDLING TECHNOLOGY

PAH Analysis with the CDS TDA 9300

Polyaromatic hydrocarbons are produced when coal, gas, and oil as well as wood, and other organic materials are combusted. Even the grilling of meat produces some of these compounds. They are present in petroleum products as creosote and asphalt. They are very common environmental contaminants.

Chemically PAH's are a class of semivolatile compounds that are known as fused rings. The common environmental contaminants range in molecular weight from 128 (naphthlene) to 276 (benzo(g,h,i)perylene). Most of them have mutagenic activity and are suspected carcinogens. Due to the health risks associated with these semivolatile materials, the EPA has developed a number of methods to qualitate and quantitate these compounds. EPA methods such as SW 846, 8100,and 8270 use GC/FID or GC/MS to qualitate and quantitate semivolatiles present in soils,solids, and liqud wastes. Air methods such as Niosh 5515 provide for liquid desorption of sorbent tubes with high limits of detection. Thermal desorption provides better sensitivity required for long term exposure studies.

A quantitative PAH standard mix was purchased at a concentration of 2000µg/ml in methanol. Dilutions were made to give concentrations of 5, 10,15, 35, 100, 300,and 500ng/µl respectively,and spike onto 6mmTenax sorbent tubes. Each concentration was run multiple times. The spiked sampling tube with Tenax was thermally desorbed on the TDA- 9300 at 340°C for 10 minutes and analyzed using a GC/MS.

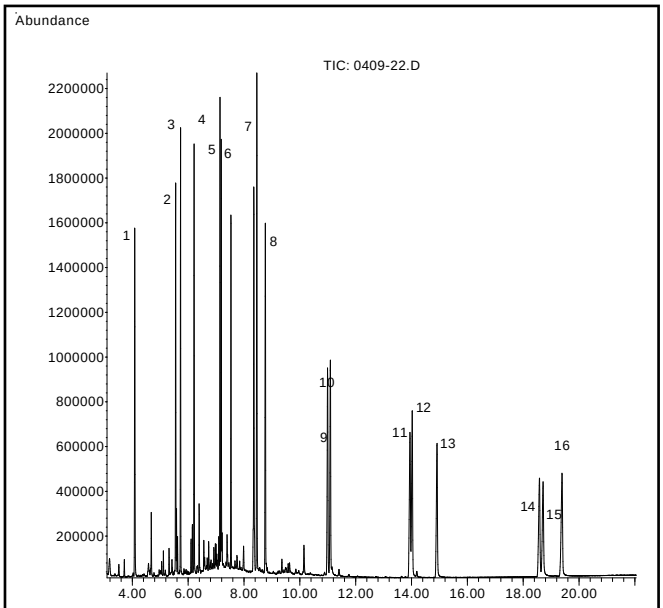

Figure 1.

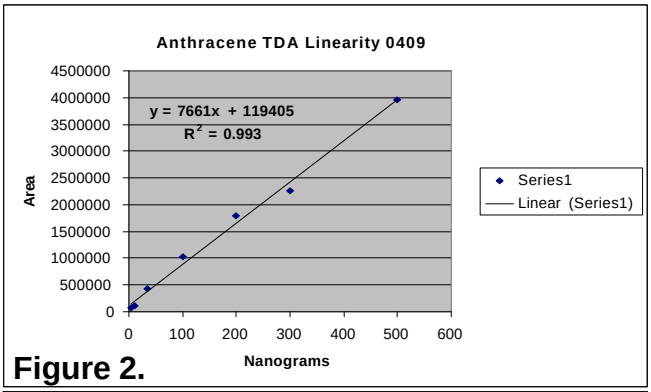

Figure 2.

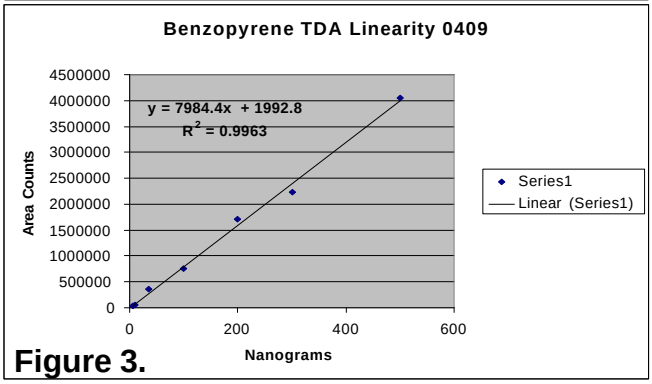

Figure 3.

Figure 1 is a chromatogram of the standard showing the PAH components. Figures 2 and 3 show selected PAH compounds with area plotted against nanograms and a .99 correlation coefficient.

Table 1. Peaks identified in Figure 1.

1. Naphthalene
2. Acenaphthylene
3. Acenaphthene
4. Fluorene
5. Phenanthrene
6. Anthracene
7. Fluoranthene
8. Pyrene
9. Benzo(a)anthracene
10. Chrysene
11. Benzo(b)fluoranthene
12. Benzo(k)fluoranthene
13 Benzo(a) pyrene
14. Indeno (1,2,3)pyrene
15 Dibenzo(a,h)anthracene
16. Benzo (ghi)perylene

Equipment

These samples were analyzed using the CDS TDA 9300 interfaced to an Agilent 6890 Gas Chromatograph. The detector used was an Agilent 5973 MSD.

CDS TDA 9300 Conditions

Valve Oven:	300°C
Transfer Line:	325°C
Dry Tube:	65°C/5min.
Tube Heat:	340°C/10min.
Trap Heat:	340°C/10min.
Aux:	325°C

GC/MS Conditions

Carrier:	Helium
Column:	HP-5MS (30m x 0.25mm x 0.25µm)
Detector:	MSD

GC Program:

Initial:	75°C
Rate 1:	25°C/minute to 245°C
Rate 2:	4°C/minute
Final:	300°C, hold 1min.

Additional literature on this and related applications may be obtained by contacting your local CDS Analytical representative, or directly from CDS at the address below.

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