

CDSolutions

APPLICATIONS INFORMATION USING ADVANCED SAMPLE HANDLING TECHNOLOGY

Automated Analysis of BTEX in Soil

Soil samples may be analyzed for volatile organic compounds, including benzene, toluene, ethylbenzene and xylene, by adding water to the soil sample and then purging the vessel to a sorbent trap. Recovery is enhanced by having a magnetic stirring bar agitate the water/soil mixture during the trapping step. The CDS 7400 Autosampler is capable of adding 5 or 10 ml of water and an internal standard, controlling the vessel temperature, stirring the sample and purging the vessel to a sample concentrator. Up to 72 samples may be processed automatically.

For this analysis, the 7400 was interfaced to a CDS Analytical 7000 purge and trap instrument equipped with a Vocarb 3000 sorbent trap. After the 5 ml of water was added, the sample vessel was purged for 11 minutes to the trap, which was then dried and thermally desorbed to a GC/MS. The gas chromatograph was equipped with a standard 5% phenyl methylsilicone column, programmed from 40° to 210°C at 10°C/minute. Helium was used as the purge gas and the GC carrier gas, with a 20:1 split.

Figure 1 shows the chromatogram of BTEX compounds purged from soil at the 50 PPB level. Peak area ratios to the internal standard using the total ion chromatogram were used to prepare a linearity plots between 5 and 100 PPB. The plot for toluene is shown as Figure 2.

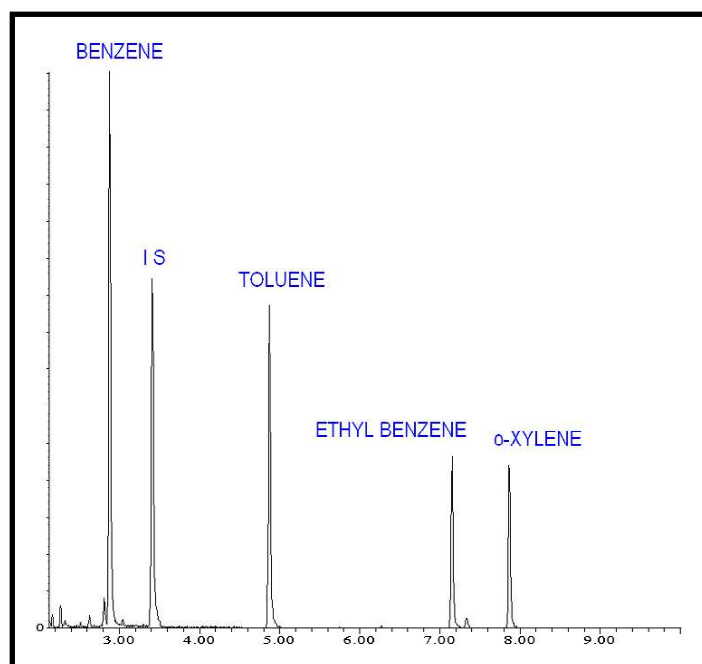


Figure 1. BTEX compounds in soil at 50 PPB each.

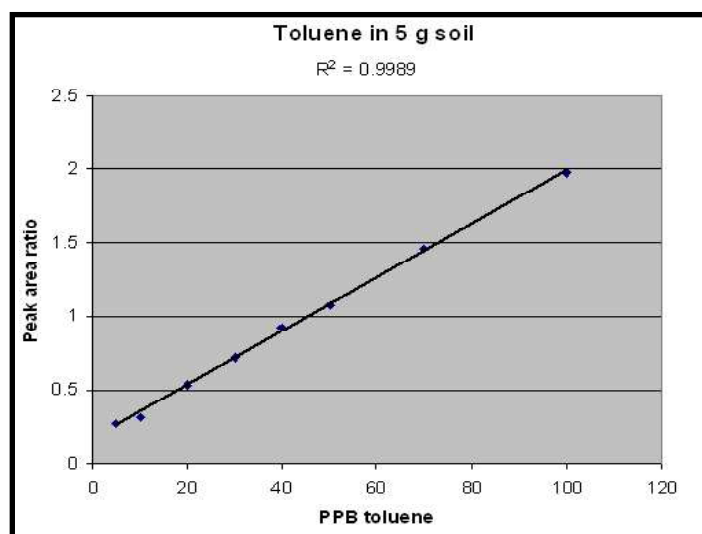


Figure 2. Linearity of Toluene purged from 5 grams of soil, from 5 to 100 PPB.

Experimental Conditions

7000 P&T

Valve oven: 130°C
Transfer line: 130°C
Purge time: 11 minutes
Purge flow: 35 ml/min
Trap dry 35°C for 1 minute
Desorb preheat: 245°C for 0.6 minutes
Trap desorb: 250°C for 2 minutes
Trap bake: 260°C for 10 minutes

Gas Chromatograph

Injection port: 300°C
Split ratio: 20:1
Column: 30 m x 0.25 mm 5% phenyl methylsilicone

Oven program

Initial: 40°C for 4 minutes
Ramp: 10°C/minute
Final: 210°C for 1 minute

Mass Spectrometer

Mass range: 35 to 550
Source: 230°C

CDS Analytical, Inc. has been a leader in the design and manufacture of laboratory instruments for sample preparation and analysis since 1969. We are dedicated to providing the best possible instruments for both research and routine analysis. Well known in the field of pyrolysis, CDS manufactures the Pyroprobe® 5000, 5150, 5200 and 5250 autosampler for the introduction and analysis of solid materials by GC, MS and FT-IR. CDS offers a complete line of dynamic headspace instruments for the analysis of volatile organic compounds in environmental, pharmaceutical and food applications, including the model 8400 four-position autosampler. CDS also manufactures the Dynatherm line of thermal desorption instruments including the 9000 series for air monitoring and the 9300 TDA. Our customers, their requirements and applications are important to us. To help meet your needs, we offer a wide range of analytical information and the services of our applications laboratory. If you would like additional information, please contact us at the address below, call us at 1 800 541 6593, or log onto www.cdsanalytical.com.