

FAST BTEX ANALYSIS WITH INTUVO

Technology Advantage: Agilent Intuvo 9000 GC with HS



Introduction

Benzene, toluene, ethyl benzene, and xylenes (*m*-xylene, *p*-xylene, and *o*-xylene) (BTEX) are often grouped together in the analysis of drinking water. These common pollutants can leach into the ground around petroleum production sites and contaminate the water table.

By using a headspace sampler and the Agilent Intuvo 9000 GC, the analysis of BTEX from drinking water can be achieved with shortened cycle times compared to other GC or GC/MS systems. The Intuvo 9000 GC yields advantages over conventional GC systems:

- Fast heating rates
- Quick column changes for easier method development
- Smaller footprint

In addition, the Agilent 7697A Headspace Sampler enables a sample overlap that further reduces analytical cycle time.

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Experimental

An Intuvo 9000 GC was equipped with a 7697A Headspace Sampler. A stock solution of BTEX in methanol at ~1,000 ppm was made before diluting in water for the final working stock solution of ~4 ppm*.

* Headspace vials were made by spiking 1 mL of the working solution into 5 mL of water.

Table 1. Instrument conditions.

Parameter	Value
Agilent Intuvo 9000 GC	
Inlet	180 °C Split 5:1
Column	Agilent J&W DB-Select 624 Ultra Inert Intuvo, 30 m × 0.32 mm, 1.8 µm (p/n 123-0334UI-INT)
Column flow	6 mL/min
Oven	40 °C, then 200 °C/min to 130 °C (4 minutes)
Jumper chip	250 °C
FID	250 °C
Agilent 7697A Headspace Sampler	
Oven	100 °C
Loop	110 °C
Transfer line	120 °C
Vial equilibration	8 minutes
Injection duration	0.5 minutes
Vial	10 mL
Shaking	On, level 2
Vial fill flow	50 mL/min
Vial fill pressure	15 psi
Vial pressure equilibration time	0.05 minutes
Loop fill ramp rate	20 psi/min
Final loop pressure	1.5 psi
Loop equilibration	0.05 minutes

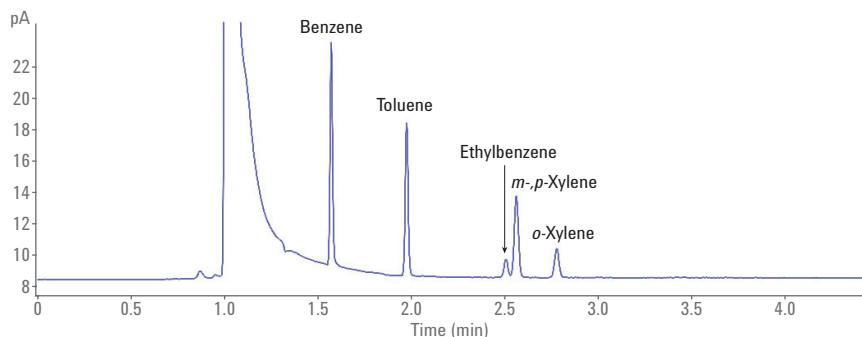


Figure 1. BTEX compounds are eluted in under 3 minutes.

Results and Discussion

Repeatability was determined from 10 headspace vials for BTEX. Average RSD was found to be 2.7 % for the five fully resolved analytes comprising BTEX.

By taking advantage of the fast heating rates afforded with the new technology included in the Intuvo 9000 GC, BTEX was eluted in under 3 minutes. The headspace vial equilibration time (8 minutes) is the rate-limiting step in this application, making the total cycle time for this analysis 8 minutes.

Conclusion

The Agilent Intuvo 9000 GC, equipped with an Agilent 7697A Headspace Sampler, delivers excellent repeatability performance for BTEX in water. The fast heating rates of Intuvo enable full resolution of the BTEX compounds in under 3 minutes. With the vial equilibration, the total analytical cycle time is only 8 minutes.

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