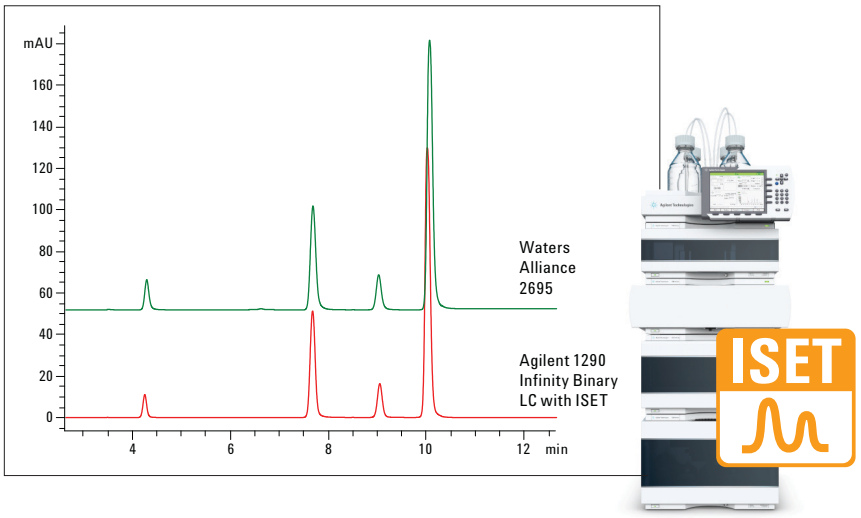
Agilent 1290 Infinity Binary LC with ISET - Emulation of the Waters Alliance 2695 LC system analyzing endocrine disruptors

Application Note

Author

A. G. Huesgen
Agilent Technologies, Inc.
Waldbronn, Germany



Abstract

The Intelligent System Emulation Technology (ISET) using the Agilent 1290 Infinity Binary LC was introduced to emulate Agilent 1200 Infinity Series and 1200 Series LCs, now, the emulation of non-Agilent LCs has been introduced.

This Application Note shows the emulation of the Waters Alliance 2695. Based on a Waters Application Note, the transfer of the analysis of endocrine disruptors onto the 1290 Infinity Binary LC using ISET was evaluated. The agreement of retention times and resolution was determined.

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Introduction

Seamless instrument-to-instrument method transfer is often a strong demand for environmental control labs and related industries, because changing established methods is expensive, time consuming, and comparison with reference data might become difficult. Equipment has to be replaced from time to time, and the 1290 Infinity Binary LC, in combination with ISET, offers the possibility to emulate older non- Agilent LC instrumentation, such as the Waters Alliance LC systems. Old methods from non-Agilent equipment can be transferred to the 1290 Infinity Binary LC with ISET and receive the same results. With the 1290 Infinity Binary LC, an UHPLC method can be applied to be prepared for the future.

This Application Note analyzed endocrine disruptors on the 1290 Infinity Binary LC using a chromatographic method developed on the Waters Alliance 2695 LC system. Seamless method transfer with excellent correlation of retention times and typically better resolution is shown.

Experimental

The following instruments were used, see Table 1.

Acquisition and Evaluation Software

OpenLAB CDS Chemstation version C.01.04 and ISET

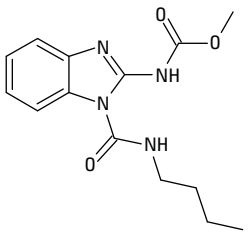
	Agilent 1290 Infinity Binary LC	Waters Alliance LC
Binary pump	G4220A	2695
Auto sampler	G4226A	
ALS cooler	G1330B	
Column compartment	G1316C	
Diode array detector	G4212A	Dual absorbance detector

Table 1
Instrumentation used.

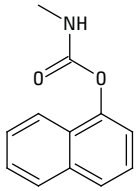
Chromatographic conditions

Column:	Symmetry C18, 3.9 × 150 mm, 5 µm
Mobile phases:	A = 10 mM phosphate pH = 6.8 (0.74 g/L NaH_2PO_4 + 1.24 g/L Na_2HPO_4), B = Methanol
Gradient:	at 0 minutes 40% B, at 20 minutes 95% B, at 21 minutes 40% B, at 25 minutes 40% B
Flow rate:	1 mL/min
Injection volume:	10 µL
Column temperature:	30 °C
Detection:	225 nm, 10 Hz, filter response 0.2

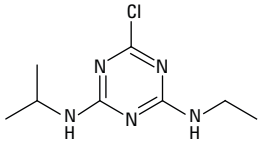
Analyzed compounds



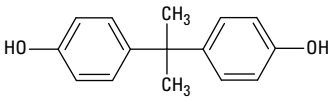
Benomyl



Carbaryl



Atrazine



Bisphenol A

Results and Discussion

The following experiments were done to prove the seamless method transfer from the Waters Alliance 2695 LC system to the 1290 Infinity Binary LC in combination with ISET.

- Analysis of endocrine disruptors on the Waters Alliance 2695, based on a Waters Application Note[1]
- Transfer of the developed method onto the 1290 Infinity Binary LC with and without applying ISET
- Determination of the deviation of retention times, specified deviation is < ±5%
- Determination of the resolution, typically better on the 1290 Infinity Binary LC, specified maximum deviation < –5%

In the 1290 Infinity Binary LC ISET set up screen, the instrumentation which should be emulated has to be selected, see Figure 1. With only four inputs, the emulation parameters are configured and can be saved together with the other chromatographic parameters, such as flow rate, temperatures, and more in one method.

Figure 2 shows the resulting chromatograms. Without ISET, all retention times shifted to lower values. With ISET, good correlation was obtained.

Figure 3 summarizes the results for the retention time differences. Without ISET, the deviation was a maximum of –7%. Using ISET, the deviation of retention times was < ±1% overall. The specified allowed deviation is < ±5%.

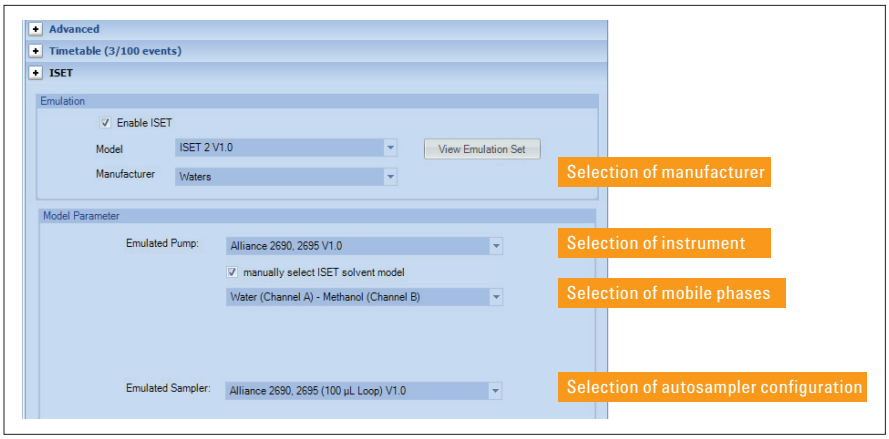


Figure 1
Selection of the instrumentation to be emulated.

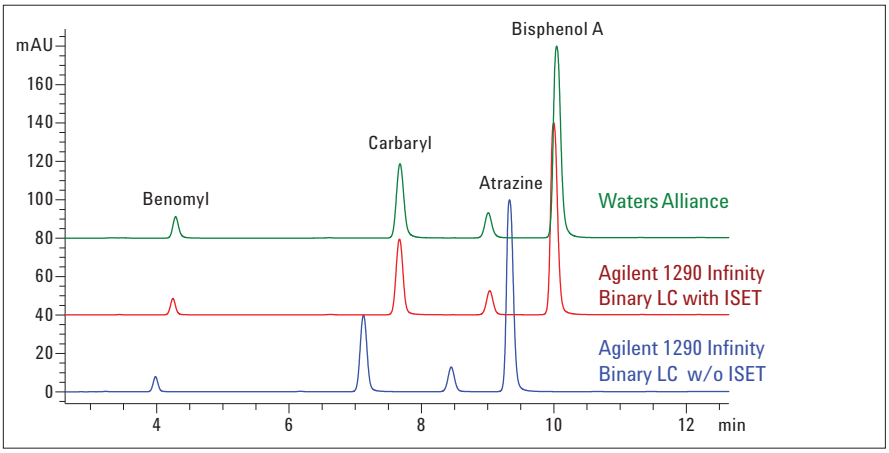


Figure 2
Overlay of chromatograms obtained on the Waters Alliance and the Agilent 1290 Infinity Binary LC with and without ISET.

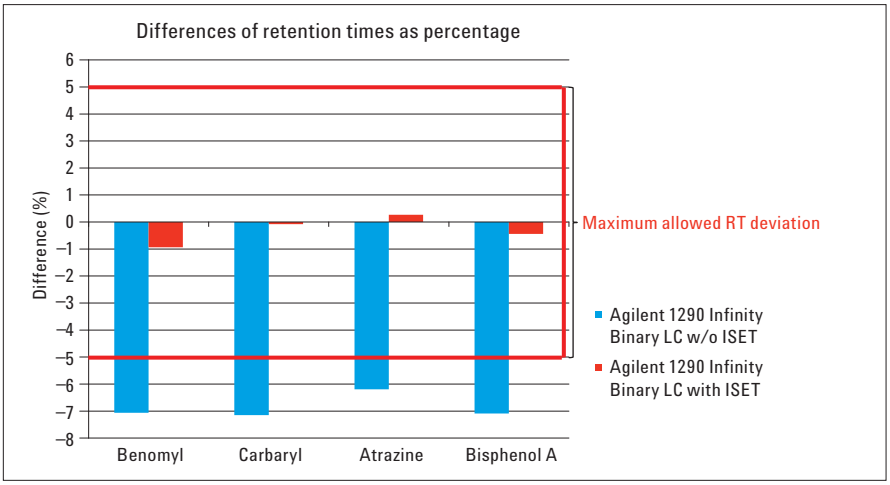


Figure 3
Deviation of retention times with and without ISET on the Agilent 1290 Infinity Binary LC.

Figure 4 summarizes the results for the resolution differences. For two compounds, the resolution was better on the 1290 Infinity Binary LC with or without ISET. This was mainly due to the small post column dispersion volume on the 1290 Infinity Binary LC compared to the configuration used for the Waters Alliance 2695 LC. The lower dispersion volume resulted in lower peak widths at half height and, consequently, in improved resolution. For the last compound, the deviation was < –1.2% with ISET. This was within the allowed maximum deviation of < –5%.

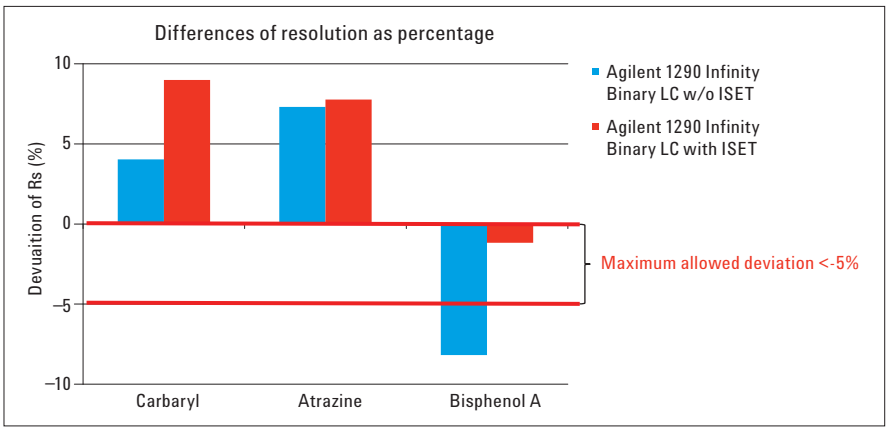


Figure 4
Resolution results with and without ISET.

Conclusions

The Agilent 1290 Infinity Binary LC in combination with the Intelligent System Emulation Technology (ISET) enables the emulation of older non-Agilent LCs, such as the Waters Alliance LC system. The allowed deviation of retention times is < ±5%. In this example, the deviation of retention times was < ±1%. The resolution had improved for two analyzed compounds on the 1290 Infinity Binary LC. For the last compound, the deviation was < –1.2% with ISET. This was within the allowed maximum deviation of < –5%.

Reference

1.
Waters application note: Endocrine disruptors in soil, **2003**.

www.agilent.com/chem/ISET

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