

Spiking Standard Curves using the GERSTEL MPS 2

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Introduction

Standard curves can be prepared automatically by the GERSTEL MPS 2 as part of a sample sequence.

The GERSTEL Maestro software facilitates automated standard curve preparation for both liquid and headspace analyses. The work detailed here was standard curve preparation for headspace analysis of analytes covering a range of volatility. It was decided that headspace standard curve preparation was likely to be the most problematic, so analytes of this volatility or less should perform in a similar fashion.

For headspace standard curve spiking as part of a sample sequence, a dual-rail MPS 2 configuration is required. This enables a liquid syringe to add the standard to the vial and a second heated headspace syringe to perform the sample injection after incubation in the integrated heated agitator.

For standard curve spiking of liquid samples, a dual-rail MPS 2 may not be required. If the volumes of standard to be spiked and the injection volume are within the syringe's capability, then a single-rail MPS 2 is sufficient for both the standard curve preparation and sample injection.

Instrumentation

- Agilent 6890N Gas Chromatograph with 5975B inert MSD
- Agilent ChemStation
- GERSTEL dual-rail Multi-Purpose Sampler (MPS 2) configured for both liquid and headspace injection
- Anatune expanded capacity tray holder
- GERSTEL Maestro software



Figure 1: A dual-rail MPS 2 configured with a 2.5mL heated headspace syringe and a 25µL liquid syringe for the standard addition.

Discussion

Careful optimisation of the standard aspiration speed is required to avoid air bubbles forming in the syringe barrel. The vial penetration is also important to set so that the standard is injected just below the meniscus, if possible.

Results

Standard curves were prepared manually using the same syringe that the MPS 2 used in order to directly compare the results.

The results tabulated below show that the correlation coefficients for the standards prepared by the MPS 2 are as good or better than those for standards prepared manually.

Analyte	Manual Curve (r^2)	MPS 2 Curve (r^2)
Chloroform	0.999	1.000
Benzene	1.000	1.000
Toluene	1.000	1.000
Carbon Tetrachloride	0.999	1.000
Ethyl Benzene	0.999	0.999
Bromoform	0.998	1.000
Bromobenzene	0.998	1.000
p-Isopropyltoluene	0.999	1.000
n-Butylbenzene	1.000	1.000
Naphthalene	0.999	0.999

Conclusions

This evaluation has confirmed the suitability of the GERSTEL MPS 2 for the automation of standard curve preparation as part of a sample sequence. The Maestro software facilitates this as part of the sequence that is fully integrated with Agilent ChemStation.