METHYL SALICYLATE

INTRODUCTION

Thermal desorption is a convenient sample introduction method for Gas Chromatograph (GC) and Gas Chromatograph / Mass Spectrometer (GC/MS) systems, particularly for the analysis of vapor-phase samples. Thermal desorption involves the removal (separation) of compounds retained on a sorbent material by heating in gas flow. The released compounds are transferred in the flow of carrier gas to the analyzer inlet as a small, discreet and concentrated sample vapor. Thermal desorption devices can be used for multipurpose sample introduction, amenable to direct sampling and analysis of volatile organic compounds in gas and liquid-phase.

Commercial standalone thermal desorption systems are often used as an accessory to GC or GC/MS systems. Coupling such a device to the GC or GC/MS often involves time-consuming procedures such as instrument shutdown, replumbing, lengthy conditioning and control with different software. Direct injection capability is also disabled with such configurations.

The standard Griffin™ 450 GC/MS/MS incorporates two integrated sample introduction modules, with no hardware modifications required for operation.

1. Split/splitless liquid injector for liquid sampling via direct syringe injection, SPME Fiber, autosampler (optional) and/or headspace sampler (optional)
2. Universal Sampling Port (USP) for vapor sampling via direct air intake through sampling line and/or portable sampling/thermal desorption with the included Griffin™ X-Sorber. The USP is part of the fully integrated Air Sampling Module (ASM) that consists of a sample loop for high concentration gas-phase samples and a preconcentrator for low concentration gas-phase samples.

The integration of multiple sample introduction modules means the Griffin 450 is ready for both gas-phase and liquid-phase sampling and analysis at all times. When equipped with a Griffin 450, operators must only transport one piece of equipment instead of multiple sets, maintain analytical flexibility and save precious response time because they do not have to stop and connect an external, standalone thermal desorption system.

This technical note compares data from the Griffin 450 system equipped with a fully integrated ASM to data collected by a standalone thermal desorption system coupled to the Griffin 450.

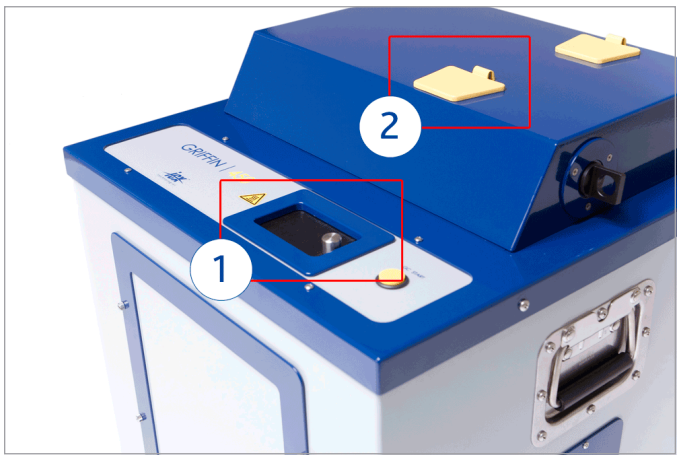

Figure 1: Griffin 450 – Mobile GC/MS/MS

INSTRUMENTATION

- Griffin 450
- Griffin System So ftware Suite (GSS)

Gas Chromatograph and Conditions

Temperature Program: 40°C hold for 2 min, then increase at 35°C per minute to 250°C	
Column	Low Thermal Mass-Gas Chromatograph (LTM-GC) Rtx-5ms, 30m x 0.25mm x 0.25µm
Carrier Gas	Helium, 1 mL/minute
Sample	Methyl salicylate (MES) in methylene dichloride

Mass Spec Conditions

ALC enabled with maximum ionization time at 150 ms	
Mass Scan Range	m/z 50-300
Detector Temperature	150°C
Injector Temperature	200°C

Integrated Thermal Desorption via Griffin 450

Tenas Tube	40°C initial, desorbing at 200°C for 4 min.
Sample Flow Path	190°C
Precon Manifold	200°C

Standalone Thermal Desorber Coupled to Griffin 450

Desorbing Conditions	280°C for 5 min.
Cold Trap	Trapping temperature - 15C, desorbing 280°C for 5 min.
Sample Path	150°C

RESULTS/ DISCUSSION

MES solutions at three different concentration levels were injected to the sorbent tube of the standalone thermal desorption system coupled to a Griffin 450. The same solutions were also introduced to the Griffin 450 with integrated ASM preconcentrator. Figure 2 shows the MES calibration curve for the Griffin 450 with integrated ASM preconcentrator. A linear curve with R2 of 0.9999 was observed. Figure 3 shows the MES calibration curve for the standalone thermal desorption system coupled to the Griffin 450. A linear curve with R2 of 0.9996 was observed.

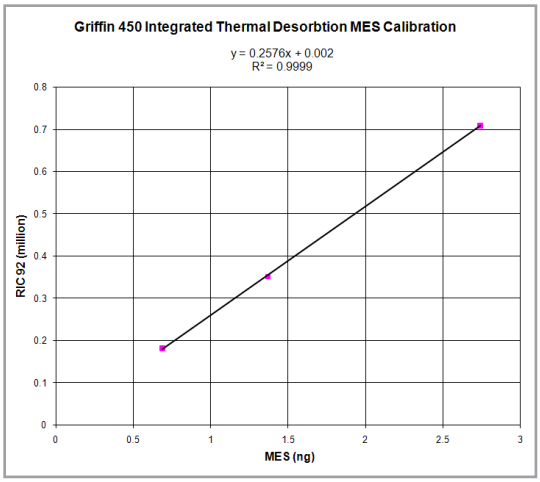

Figure 2: MES calibration curve for Griffin 450 ASM preconcentrator

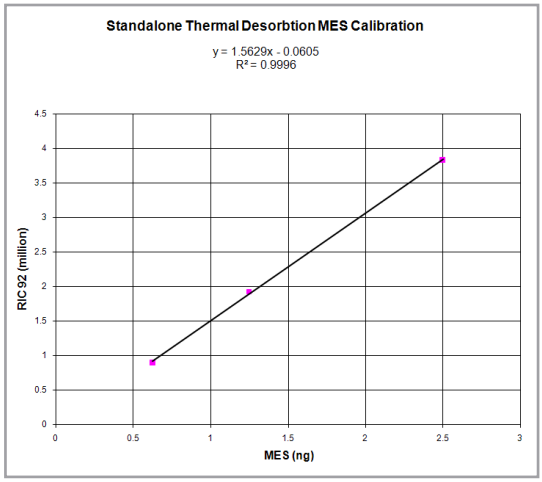

Figure 3: MES calibration curve for standalone thermal desorption system coupled to Griffin 450

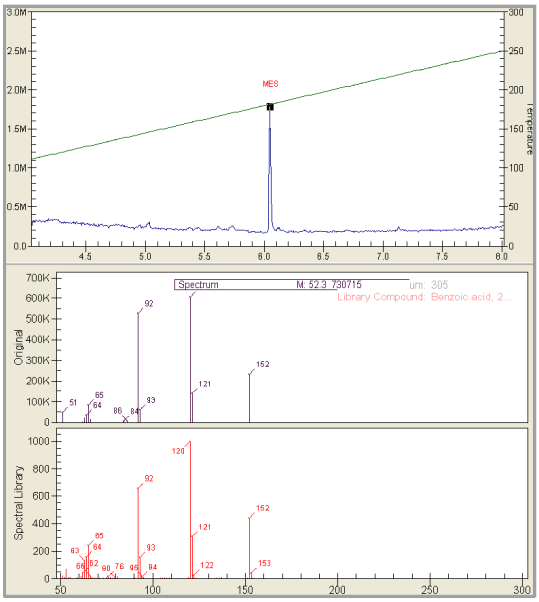

Figure 4: GC/MS result of MES desorbed from the Griffin 450 ASM preconcentrator

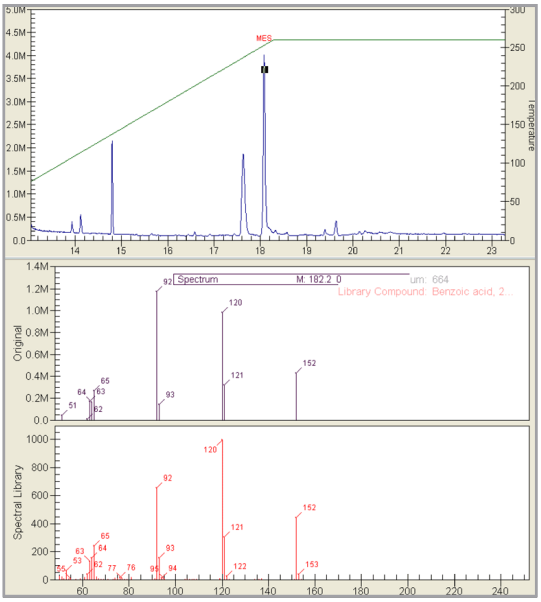

Figure 5: GC/MS results of MES desorbed from the standalone thermal desorption systems coupled to the Griffin 450

Figures 4 shows the GC/MS results of MES desorbed from the Griffin 450 ASM preconcentrator. Figure 5 shows the GC/MS results of MES desorbed from the standalone Thermal Desorption System. More extraneous peaks were observed from the standalone Thermal Desorption System.

CONCLUSION

The Griffin 450 with integrated ASM for thermal desorption provides equivalent and in some cases better data results than standalone commercial desorption systems coupled to the Griffin 450. By offering both liquid and vapor-phase sample inlets on one system, the Griffin 450 offers analytical flexibility in a compact package that is easy-to-use and transport for field applications.

These data represent typical results.

References

1. Wells, J.M.; Badman, E.R.; Cooks, R.G. Anal. Chem. 1998, 70, 438-444.
2. Patterson, G.E.; Guymon, A.J.; Riter, L.S.; Everly, M.; Griep-Raming, J.; Laughlin, B.C.; Ouyang, Z.; Cooks, R.G. Anal. Chem. 2002, 74, 6145-6153.

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