

RapidTrace® SPE Workstation and TurboVap LV® Concentration Workstation

## Automated SPE Extraction of Morphine and Codeine from Urine Samples

Morphine and Codeine are the two opiate drugs designated by SAMHSA (Substance Abuse Mental Health Service Administration) (formerly National Institute for Drug Abuse, NIDA) for analysis in employment and pre-employment situations to determine if heroin, codeine or morphine have been used. Numerous methods have been published describing methods to extract morphine and codeine from urine either by traditional liquid/liquid means or by solid phase extraction.

Liquid/liquid extractions are time consuming, difficult to automate and require great analyst skill if they are to produce reproducible and accurate results. Each manufacturer of solid phase extraction cartridges have published methods to accomplish the extraction of morphine and codeine from urine. This preliminary method uses 3 mL Confirm HXC Isolute™ cartridges available from Jones Chromatography, Inc. After extractions were completed all samples were evaporated in a TurboVap LV Evaporation Workstation, derivatized and analyzed by GC/MS as recommended in the published procedure. Data for codeine and morphine are presented in Tables 1 and 2.

Preliminary data obtained for codeine using a Hewlett-Packard 5971 GC/MS system with RTE-A data system. Extracts prepared by the Zymark RapidTrace™ SPE Workstation.



**Table 1**

SPIKE ng/mL	CALCULATED LEVEL, ng/mL	% RECOVERY
150	160	107%
300	340	113%
600	640	107%
240 control	220	92%
360 control	320	89%
0	0.56	N/A
0**	65	.065% method carryover

\*\*blank extracted after a 100,000 ng/mL spiked sample extraction.

# Automated SPE Extraction of Morphine and Codeine from Urine Samples

Preliminary analytical data obtained for morphine using a Hewlett-Packard 5971 GC/MS system with RTE-A data system. Extracts prepared by the Zymark RapidTrace™ SPE Workstation.

**Table 2**

SPIKE ng/mL	CALCULATED LEVEL, ng/mL	% RECOVERY
150	150	100%
300	330	110%
600	560	93%
240 control	210	88%
360 control	330	92%
0	1.1	N/A
0**	16	.032% method carryover

\*\*blank extracted after a 50,000 ng/mL spiked sample extraction.

Data courtesy of National Medical Services, Inc. Willow Grove, PA, 19090.

## RapidTrace™ SPE Workstation - High Throughput, Controlled, Walk-away Automation for Solid Phase Extraction (SPE).

The RapidTrace SPE Workstation is the only automated technology designed specifically for controlled, high throughput solid phase extraction sample preparation. The modular design allows analysts to configure the precise amount of modules needed to perform the daily workload and offers the opportunity to add more as the workload increases. By allowing each stage of the SPE process to be individually flow rate controlled using positive pressure, methods can now be run under "optimum" conditions. This ensures data consistency from day to day and lab to lab.

### The RapidTrace™ SPE Workstation provides:

- Control of all SPE sample and solvent flow rates at each step in the process.
- Throughput for up to 100 samples at typical rates of 60 samples/hour with only several minutes of operator attention.
- Collective or individual module programming for maximum flexibility in methods development or routine high capacity operation.
- Simple Windows™-based "point and click" operator interface for ease of use - new methods are typically programmed in under 10 minutes - recalled methods are operational in seconds.