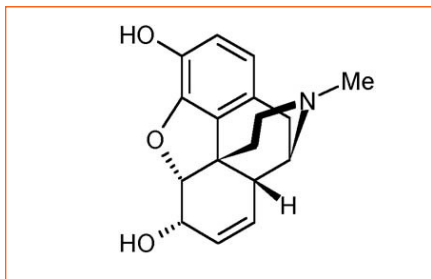


# Method for the extraction of Morphine and Codeine from urine using ISOLUTE<sup>®</sup> HCX and RapidTrace<sup>®</sup> Workstation

## Introduction

This application note describes for the extraction of the opiates, morphine and codeine from urine using ISOLUTE HCX and RapidTrace Workstation.



**Figure 1.** Structure of morphine

Morphine and codeine are two of the opiates analysed in drugs of abuse testing, they are both on the SAMHSA (Substance Abuse Mental Health Service Administration) and NIDA (National Institute for Drug Abuse) lists as drugs to be tested for workplace drug testing.

## Columns

ISOLUTE HCX (3 mL 200 mg part number 902-0020-B) is a silica-based mixed-mode sorbent optimized to extract drugs of abuse from biological fluids. The combination of non-polar and strong cation retention mechanisms allows for rigorous interference elution steps resulting in extremely clean extracts.

*'The methods offered within this application are meant to represent a starting point and guide for method development and some amendment may be necessary.'*

## Analytes

Morphine and codeine.

The SPE steps were configured schematically using the RapidTrace software as follows:

## RapidTrace procedure

	Step	Source	Destination	Volume (mL)	Flow ( mL/sec)
1	Condition	Methanol	Waste 2	3.0	0.30
2	Condition	Water	Waste 1	2.0	0.30
3	Condition	H <sub>2</sub> PO <sub>4</sub> , pH6	Waste 1	1.0	0.30
4	Load	Sample	Waste 1	4.0	0.04
5	Pause		Time = 0.1 min		
6	Purge-Cannula	Water	Cannula	4.0	0.40
7	Rinse	Water	Waste 1	2.0	0.15
8	Rinse	H <sub>2</sub> PO <sub>4</sub> , pH4	Waste 1	2.0	0.15
9	Rinse	Methanol	Waste 2	3.0	0.15
10	Rinse	Vent	Waste 1	5.0	0.30
11	Collect	Mixed elution	Fraction 1	3.0	0.20
12	Rinse	Mixed elution	Waste 2	2.5	0.20
13	Rinse	Methanol	Waste 2	4.0	0.20
14	Purge-Cannula	Methanol	Cannula	3.0	0.40
15	Purge-Cannula	Water	Cannula	3.0	0.40

## Reagent lines

Line 1: Water

Line 2: Methanol

Line 3: Phosphate buffer, pH 6

Line 4: Phosphate buffer, pH 4

Line 5: Elution solvent: 780 mL methylene chloride: 200 mL isopropanol: 20 mL concentrated ammonium hydroxide

Biotage recommends TurboVap Workstations post elution to blow down your samples.

## Results

The results show that reproducible recoveries at significant levels in relation to drugs of abuse testing are possible above 85%.

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	11	N/A
0**	16	0.032%

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

## Ordering information

Part number	Description	Quantity
902-0020-B	ISLOUTE HCX 3 mL 200 mg	50
C50000	RapidTrace 3 mL Workstation	1
C50974	Tube Rack (13 x 100 mm Sample Tubes & 12 x 75 Fraction Tubes)	1
C40707	Test Tubes-13 x 100 mm	1000
C44651	Test Tubes-12 x 75 mm	1000
C52006	RapidTrace Start-Up Kit	1
C52689	RapidTrace Notebook Controller	1

## RapidTrace Overview



The RapidTrace has been designed to eliminate sample preparation bottlenecks and it is a modular, highly scalable, automated platform designed for high throughput. Units are available to accommodate 1 mL, 3 mL and 6 mL SPE cartridges. Up to 10 modular units can be connected together and controlled through a simple, easy-to-use software package. The systems are widely used within analytical industry and are ideal both for industrial settings and for efficient SPE method development.

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