

Automated Solid Phase Extraction of Tricyclic Antidepressant Drugs from Serum



RapidTrace*

Figure 1. The RapidTrace* for automated SPE.

Introduction

With the widespread clinical use of antidepressant drugs comes the need to accurately measure therapeutic levels to determine proper dosage, as well as check for toxic levels and patient compliance. More and more laboratories are shifting their therapeutic drug monitoring from liquid extraction to solid phase extraction. A large clinical laboratory has automated the process of extracting these drugs from serum using the RapidTrace* SPE Workstation.

Sample Preparation

Prior to the extraction, 1 mL of serum is diluted with 2 mL of phosphate buffer and 0.1 mL of internal standard. The sample is vortexed and centrifuged, then decanted into a 13 x 100 mm test tube to remove any particulates. Once all samples are prepared they are placed in the RapidTrace* with ISOLUTE* HXC 130 mg/3 mL part number 902-0013-B columns.

Step	Source	Destination	Volume (mL)	Flow (mL/sec)
Condition	Methanol	Waste 2	3.0	0.25
Condition	Water	Waste 1	3.0	0.25
Condition	Buffer	Waste 1	1.0	0.25
Load	Sample	Waste 1	3.0	0.05
Rinse	Water	Waste 1	3.0	0.10
Purge Cannula	Water	Canula	6.0	0.50
Rinse	Acetic Acid	Waste 1	1.0	0.10
Rinse	Methanol	Waste 2	3.0	0.10
Dry		Time =	2.0	min
Collect	Elution Solvent	Fraction 1	3.0	0.03
Purge Cannula	Methanol	Cannula	6.0	0.50
Purge Cannula	Water	Cannula	6.0	0.50

Table 1. Details this laboratory's procedure

After the extraction is complete, the 3 mL sample eluate is evaporated to dryness and reconstituted with mobile phase. Samples are analyzed by HPLC. Control samples were prepared with four common antidepressant drugs (Amitriptyline HCL, Nortriptyline HCL, Imipramine HCL, Desipramine HCL). For this study, samples containing these drugs were run for five consecutive days. As demonstrated in Table 2, this extraction technique yielded excellent day to day reproducibility.

	Amitriptyline (ng/mL)	Nortriptyline (ng/mL)	Imipramine (ng/mL)	Desipramine (ng/mL)
Day 1	93.0	102.7	113.3	104.3
Day 2	95.6	104.2	112.2	104.6
Day 3	94.5	104.8	113.6	103.4
Day 4	92.8	106.7	115.2	108.6
Day 5	98.8	103.4	118.6	109.1
	Mean = 94.54	Mean = 104.36	Mean = 114.58	Mean = 106.0
Target Value	95.9	102.7	112.5	106.3
Average Recovery %	98.5	102.6	101.9	99.7
C.V. (%)	1.8	1.5	2.2	2.5

Table 2.

Ordering Information

Part Number	Description	Quantity
C50000	RapidTrace®+ Workstation 1 mL and 3 mL (10 columns)	1
C103198	TurboVap® LV 100/120V	1
C103199	TurboVap® LV 220/240V	1
902-0013-B	ISOLUTE® HCX 130 mg/3 mL Sample Volume Columns	50

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EUROPE

Main Office: +46 18 565900
 Toll Free: +800 18 565710
 Fax: +46 18 591922
 Order Tel: +46 18 565710
 Order Fax: +46 18 565705
order@biotage.com
 Support Tel: +46 18 56 59 11
 Support Fax: +46 18 56 57 11
eu-1-pointsupport@biotage.com

NORTH & LATIN AMERICA

Main Office: +1 704 654 4900
 Toll Free: +1 800 446 4752
 Fax: +1 704 654 4917
 Order Tel: +1 704 654 4900
 Order Fax: +1 434 296 8217
ordermailbox@biotage.com
 Support Tel: +1 800 446 4752
 Outside US: +1 704 654 4900
us-1-pointsupport@biotage.com

JAPAN

Tel: +81 3 5627 3123
 Fax: +81 3 5627 3121
jp_order@biotage.com
jp-1-pointsupport@biotage.com

CHINA

Tel: +86 21 2898 6655
 Fax: +86 21 2898 6153
cn_order@biotage.com
cn-1-pointsupport@biotage.com

To locate a distributor,
 please visit our website at
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