

RapidTrace SPE Automated Workstation

Automated SPE Extraction of Tricyclic Antidepressant Drugs from Serum

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 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.

Table 1.

Step	Source	Destination	Volume (ml)	Flow (ml/sec)
Condition	Methanol	Waste 2	3.0	0.25
Condition	Water	Waste1	3.0	0.25
Condition	Buffer	Waste1	1.0	0.25
Load	Sample	Waste1	3.0	0.05
Rinse	Water	Waste1	3.0	0.10
Purge-Cannula	Water	Cannula	6.0	0.50
Rinse	Acetic Acid	Waste1	1.0	0.10
Rinse	Methanol	Waste2	3.0	0.10
Dry		Time =	2.0	min
Collect	Elution solvent	Fraction1	3.0	0.03
Purge-Cannula	Methanol	Cannula	6.0	0.50
Purge-Cannula	Water	Cannula	6.0	0.50

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 3 mL syringe barrel HXC columns. (International Sorbent Technology, Ltd). 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.

Table 2.

	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	96.8	103.4	118.6	109.1
	mean = 94.54	mean = 104.36	mean = 114.58	mean = 106
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