

Name of Procedure:

Toxicology
Solid Phase Extractions utilizing the Zymark RapidTrace SPE Workstation

Suggested Uses:

This procedure does not cover every aspect of the instrument used. The operator of the instrument should read the manual for the instrument before using this procedure.

This instrument is utilized to extract drugs from whole blood, urine, or other aqueous liquids using United Chemical Technologies Clean Screen Extraction Columns[®].

Items Used to Perform Extractions:

Test tubes, 16 x 125, 13 x100, 12 x 75
Test tube caps or stoppers
United Chemical Technologies Clean Screen Extraction Columns[®]
Zymark: RapidTrace SPE Workstation and Controller
Nitrogen gas

Reagents Used:

2N NaOH
2N HNO₃

Calibration of Instrument:

No calibration is necessary.

Quality Control:

Quality Control is verified for each extraction by utilizing a control standard (Blank or Standard).

Sample Preparation:

Place the previously prepared blood, urine, or other aqueous liquids into separate 13 X 100 test tubes.

Extraction Procedure:

1. Turn power on at the rear of the Zymark RapidTrace SPE Workstation modules, and turn power for the workstation on at the designated location (top right corner).
2. From the Main Menu, double-click on the Rapid Trace Production Icon and wait until the screen appears.
3. Single-click on the Setup Racks from the Main Menu.
4. Select the module(s) that are going to be used for the extractions by placing an X in the box beside the module.
5. Assign the desired procedure to the appropriate sample(s) by the following steps:
 - a. Single-click on the procedure
 - b. Single-click on the appropriate sample(s)
 - c. When the samples are selected single-click on the arrow button between the two boxes.
6. When finished with the setting up of the racks then single-click on the OK/Save button.
7. Place the 13 X 100 test tubes containing blood, urine, or other aqueous liquids into the designated positions on the rack.
8. Place the 12 X 75 collection tubes into the proper locations on the rack.
9. Insure that the appropriate reagent lines are in the proper reagents (check Reagent Setup for the appropriate locations).
10. Insert the rack into the module that it has been previously programmed for.
11. Place the designated extraction columns into the correct locations on the turret.
12. Single-click on Run/Monitor from the Main Menu.
13. This screen displays a box representing each module in the ten module workstation. The screen will show which module(s) you have made active. Insure that the correct modules are active. For each active module, check to verify that the proper procedure is assigned to the correct sample. Insure that the gas supply is on and

an adequate quantity exists.

14. If this screen is correct, then single-click on the Run button to start the corresponding module; however, if the screen is incorrect then Exit this screen and return to the Setup Racks screen (see step 3.).
15. Periodically monitor the controller to insure that the modules are running properly.

Post Extraction Procedure:

1. Evaporate the solvent from the collection test tubes.
2. Derivatization of some drugs may be necessary for analysis by gas chromatography - mass spectroscopy. Suggested derivative is the trimethylsilyl (TMS) by BSTFA or BSA. The following compounds are some that may need derivatization: consult the GC/MS operator.
 - a. Some opiates
 - b. Cocaine metabolites
 - c. Some benzodiazepines and their metabolites

Safety Concerns:

When working with biohazardous samples use protective measures, such as gloves, eye protection, and work with the samples in a biosafety hood.

BSA and BSTFA should be handled in a fume hood, with gloves, and eye protection.

Maintenance:

1. Zymark: RapidTrace SPE Workstation
 - a. Check reagent levels daily before using.
 - b. Clean protein build up when needed by passing about 7.5 mL 2N NaOH and 2N HNO₃ through the cannula to the aqueous waste.

Comments:

Reagent flow should be between 1 to 15 mL per minute, except for elution reagents and samples which should be no more than 5 mL per minute.

**Drug Chemistry Section
Drug Chemistry Procedure Manual
Effective Date: March 15, 2003**

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Supercedes: September 1, 1996**

Literature References:

RapidTrace SPE Workstation Installation and Quick Reference Manual, revision 0, Zymark Co., 1995.

Clean Screen® Extraction Column Applications Manual, United Chemical Technologies, Inc., Bristol, PA.