Technical documentation

“Supply, installation and maintenance of Automatic Clean-up System for POPs in food and environmental Sample with special emphasis on polychlorinated dioxins and furans, PCBs and PBDEs”

J2 SCIENTIFIC
Automating Your World

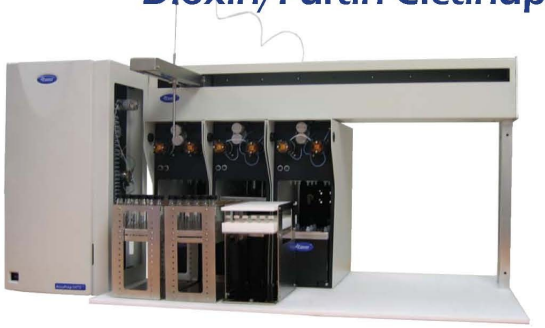
SPE Product Line

AccuPrep MPS
Automated Inline SPE System for Dioxin/Furan Cleanup

J2 Scientific introduces the ultimate flexibility and automation for the cleanup of Dioxins, Furans, PCBs and PBDEs.

The AccuPrep Multi-Platform System for Dioxin/Furan Cleanup offers the ability to combine many of the approved cleanup techniques for Dioxins on one automated platform. Optional automated inline concentration completes the package.

Flexible software allows for the single or combined automation of traditional GPC Cleanup, SPE and evaporation techniques on one compact system



- Program Methods for:
  Inline SPE Single Column *
  Inline SPE Multi-Column *
  GPC Cleanup *
  Stand Alone Concentration **
  GPC Cleanup with Inline SPE Multi-Column*
  GPC Cleanup with Inline SPE Single Column*
  * Mode can be combined with optional AccuVap Inline Concentration system
  ** Requires optional AccuVap FLX System

Section 2.1.1 Item 3

- Combine Methods into a Macro-Method for increased automation.
  Example Macro-Methods:
  - Stand Alone Concentration ⇨ GPC Cleanup ⇨ Inline SPE Multi-Column ⇨ Inline Concentration
  - Inline SPE Single Column ⇨ Inline Concentration ⇨ Inline SPE Single Column

Section 2.1.1 Item 2

Section 2.1.1 Item 1

- For a wide range of applications including:
  POPs in Foods, Environmental, Clinical, Water, Biological and Pharamceutical samples.
- Inject entire sample into system
- Maximum system capacity by Method:
  - GPC with Evaporation – 72 Samples
  - GPC Only Mode – 72 Samples
  - GPC with SPE Mode - 27 Samples
  - SPE Single Column Mode – 27 Samples
  - SPE 2 Column Mode – 18 Samples
  - SPE 3 Column Mode – 9 Samples
  - SPE w/ Evap. Single Column Mode–27 Samples
  - SPE w/ Evaporation 2 Column Mode – 18 Samples
  - SPE w/ Evaporation 3 Column Mode – 9 Samples

Section 1.2.6 Sub-criteria 1

Method screen showing GPC Cleanup with Inline SPE 3 Column Mode

Request more details:
J2 Scientific, LLC
1901 Pennsylvania Drive, Ste. C, Columbia, MO. 65202
(573) 214-0472 (866) 292-0472 Fax (573) 214-0474
www.j2scientific.com sales@j2scientific.com

GPC Cleanup Specifications

Key Features
- Septum Piercing for sample & collect vials
- Probe Tracking
- Solvent Level Sensor
- UPS Power Watchdog
- Uses Disposable, Sealable Sample Vials
- Flow-rate calibration
- Bypass or 5-Column Selector Valve
- Column Heater Control
- Automated Solvent Switching
- Solvent Flow Ramping
- Multiple Injections

Software Features
- Windows-based PC software
- Use desktop or on-board PC
- Priority Sample
- Fractionation
- Programmable solvent addition for vial rinsing
- CLP-Driven Reports
- Sample Reports
- Calibration Reports
- Sequence Reports
- Peak Finding
- Auto Resolution Calculation

Tray Options
Standard Trays
72 Pos. 16mm Culture Tube
72 Pos., 25 x 200 mm vials
42 Pos., 38 x 200 mm vials
Boiling Flasks, 250 mL, 24 Pos
TurboVap Tubes, 200 mL 25 Pos
Bottles, 125 mL 25 Pos.
RapidVap Tubes, 500mL, 12 Pos.
Specialty Trays Created By Request

Columns
Traditional Glass
Express™ Performance
Envirosep-ABC (by Phenomenex)
Others available by request

Exhance The Platform
AccuVap Inline™
AccuVap FLX™
Automated SPE Modules (up to 5)

Automated SPE Specifications

Key Features
- Positive Pressure
- Closed System
- Programmable flow-rates to 50 mLs/min
- Septum Piercing for sample & collect vials
- Probe Tracking
- Solvent Level Sensor
- UPS Power Watchdog
- Uses Disposable, Sealable Sample Vials
- Automated Solvent Switching; up to 10 elution solvents (more than 3 requires optional Solvent Selector Valve)
- Multiple Injections

Software Features
- Windows-based PC software
- Select Forward and reverse/bypass for each module during each operation
- PC interface allows quick programming of operations including: ***Condition, Sample Addition, Elution, Wash, Dry, Purge***, and other tasks.
- Priority Sample
- Fractionation
- Programmable solvent addition for vial rinsing
- Sample Reports
- Sequence Reports

Section 2.1.1 Item 3

Tray Options
Standard Trays
72 Pos. 16mm Culture Tube
72 Pos. GC Vials
72 Pos., 25 x 200 mm vials
42 Pos., 38 x 200 mm vials
Boiling Flasks, 250 mL, 24 Pos
TurboVap Tubes, 200 mL 25 Pos
Bottles, 125 mL 25 Pos.
RapidVap Tubes, 500mL, 12 Pos.
Specialty Trays Created By Request

Columns
Adapts to many standard SPE cartridges and columns including:
- 1mL, 3mL, 6mL, 10mL, 15mL
- FMS & other specialty columns
- up to 75mL columns

Exhance The Platform
AccuVap Inline™
AccuVap FLX™
AccuPrep MPS™ GPC Cleanup

Add the AccuVap

Adding the AccuVap Inline or FLX™ Evaporation Systems let you choose from two evaporation modes: Evaporation Only (FLX model only) or Inline Concentration from another process like GPC Cleanup or SPE.

Unlike other semi-automated evaporation systems, the AccuVap™ will automatically solvent exchange and quatitatively transfer your sample. Whether you have more preparative steps to perform or are ready for analysis, the AccuVap™ concentrates your sample to the volume you choose and transfer into the vial specified.

- Two endpoint choices: dryness or adjustable endpoint (1-5mL)
- Precise heating control to protect sensitive analytes
- Automatically solvent exchange sample to solvent of choice
- Transfer concentrated sample into GC vial or other storage vial
- Two adjustable level sensors monitor sample volume at all times and signal when target volume is reached
- Heated rinse cycle with choice of solvent ensures no carry-over from sample to sample

Published system brochure of tender offering from J2 Scientific with notations for tender-specific items; hard-copy included in tender packet.

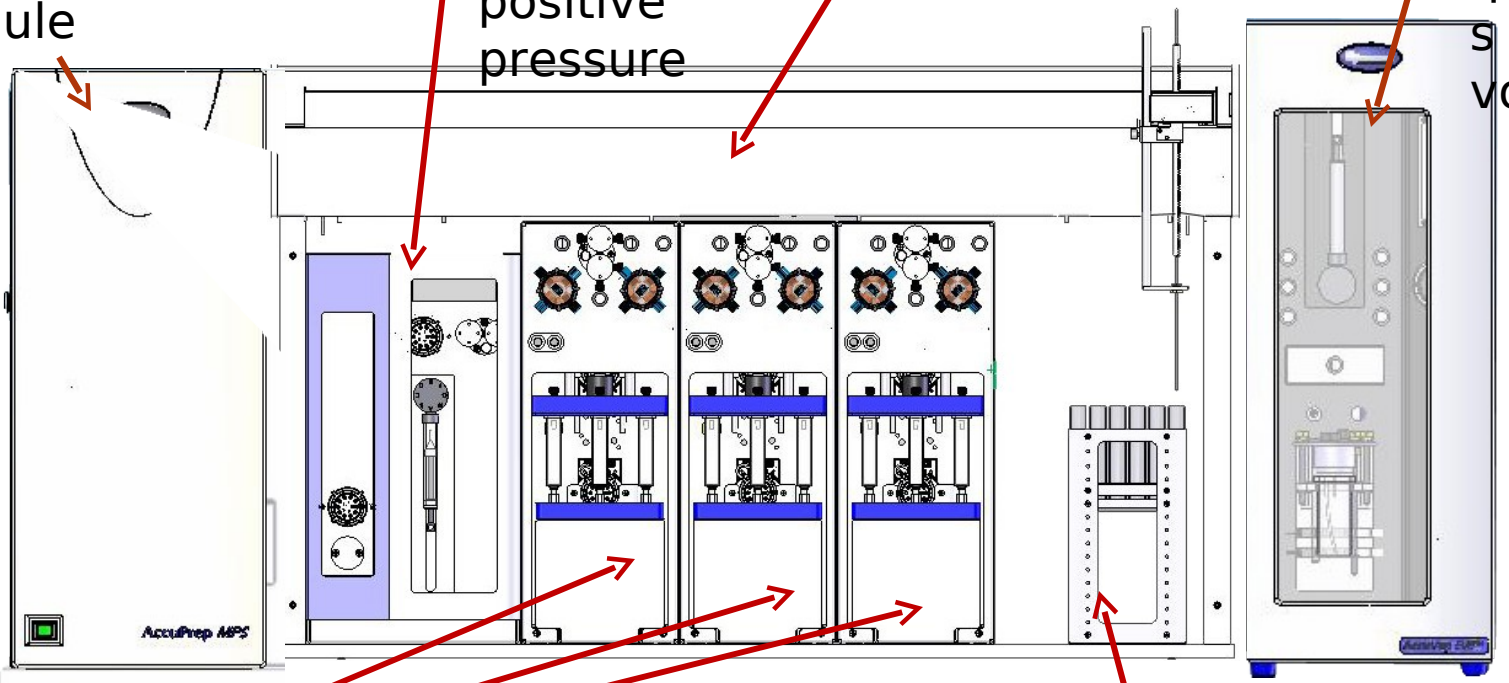
Automated System for the Cleanup of POPs

AccuPrep MPS GPC Cleanup Module

SPE Main module controls injection & flow through columns with positive pressure

Autosampler with increased capacity to process more samples

AccuVap concentrates fractions inline & quantitates final volume



Column modules hold up to 9 columns

Up to 5 column modules can be added to the system

Many tray configurations for samples and collection

Modular System

- Combine AccuPrep MPS and/or AccuVap with SPE main module and up to 5 column modules
- Each column module can hold 9 columns
- Two modes of operation:
  - Single Column Mode: one column per sample for a maximum capacity of 45 samples
  - Multi-Column Mode: combine column modules inline for multi-column cleanup
    - Choose 2-, 3-, 4- or 5-column cleanup (requires optional modules)
    - For each step in the method, set modules to inline, bypass or reverse independently to control flow through each column
- System can be configured to introduce sample volumes from 100µL to 1 liter
- Positive pressure for SPE ensures controlled flow through columns; user programmable flow rates for each step

Example SPE Applications

- Standard Phase SPE
  - Interferents held on column while analytes of interest elute through.
- Reverse Phase SPE
  - Interferents flow through column, analytes held on column and eluted off with different solvent
- SPE with Multiple Collect Fractions
  - Different solvents are used to elute multiple fractions off the SPE column into separate vials

Example SPE Applications

- Multi-Column Cleanup
  - Eluate from one column is introduced to a secondary column inline
- Multi-Column Cleanup for Dioxin Prep
  - Sample introduced from Silica to Alumina to Carbon column for Dioxin cleanup
- GPC Cleanup with SPE
  - GPC cleanup collect fraction is introduced inline to SPE Column(s)
  - Or, SPE cleanup prior to injection on GPC system

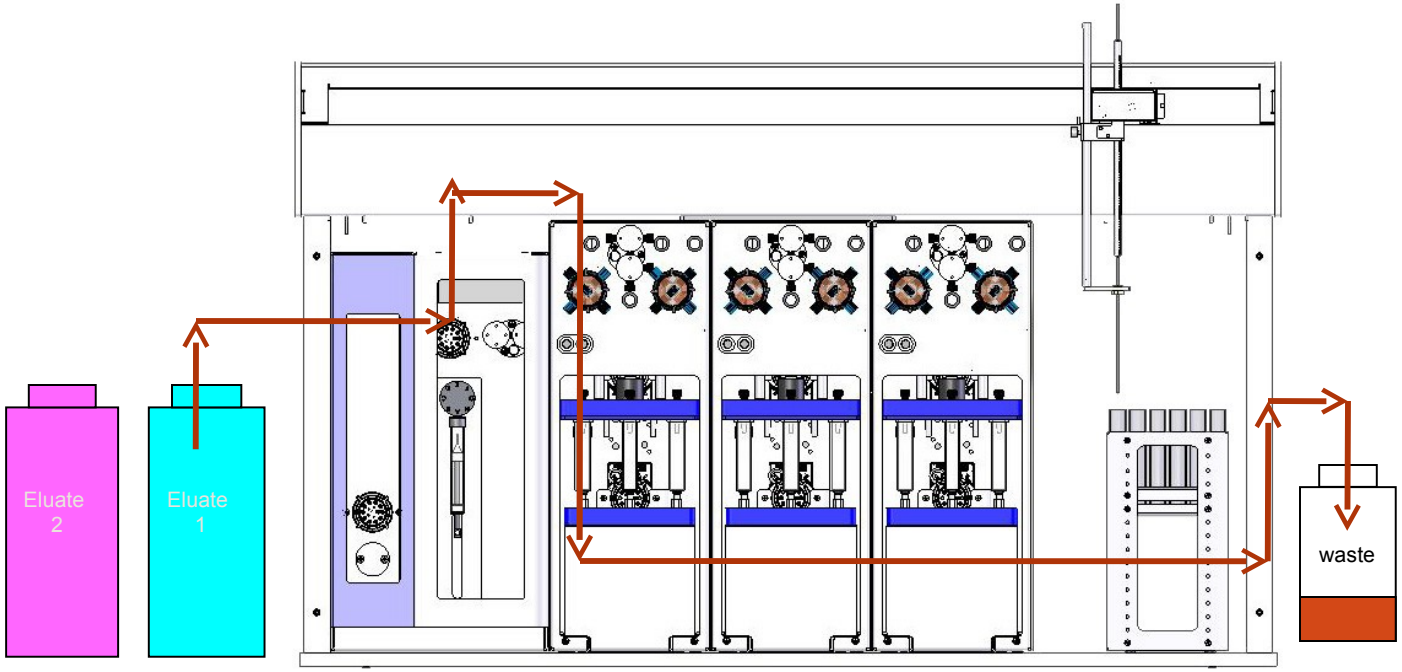
Example SPE Applications

- SPE with AccuVap
  - SPE collect eluate is concentrated automatically inline and quantitated sample is delivered ready for analysis
- GPC, AccuVap, SPE
  - GPC Collect fraction is concentrated inline; final volume is introduced to SPE column for further cleanup
- SPE, AccuVap, SPE
  - SPE eluate is concentrated inline and final volume is introduced to another SPE column for further cleanup

Example 1
Single Column Mode for Inline SPE

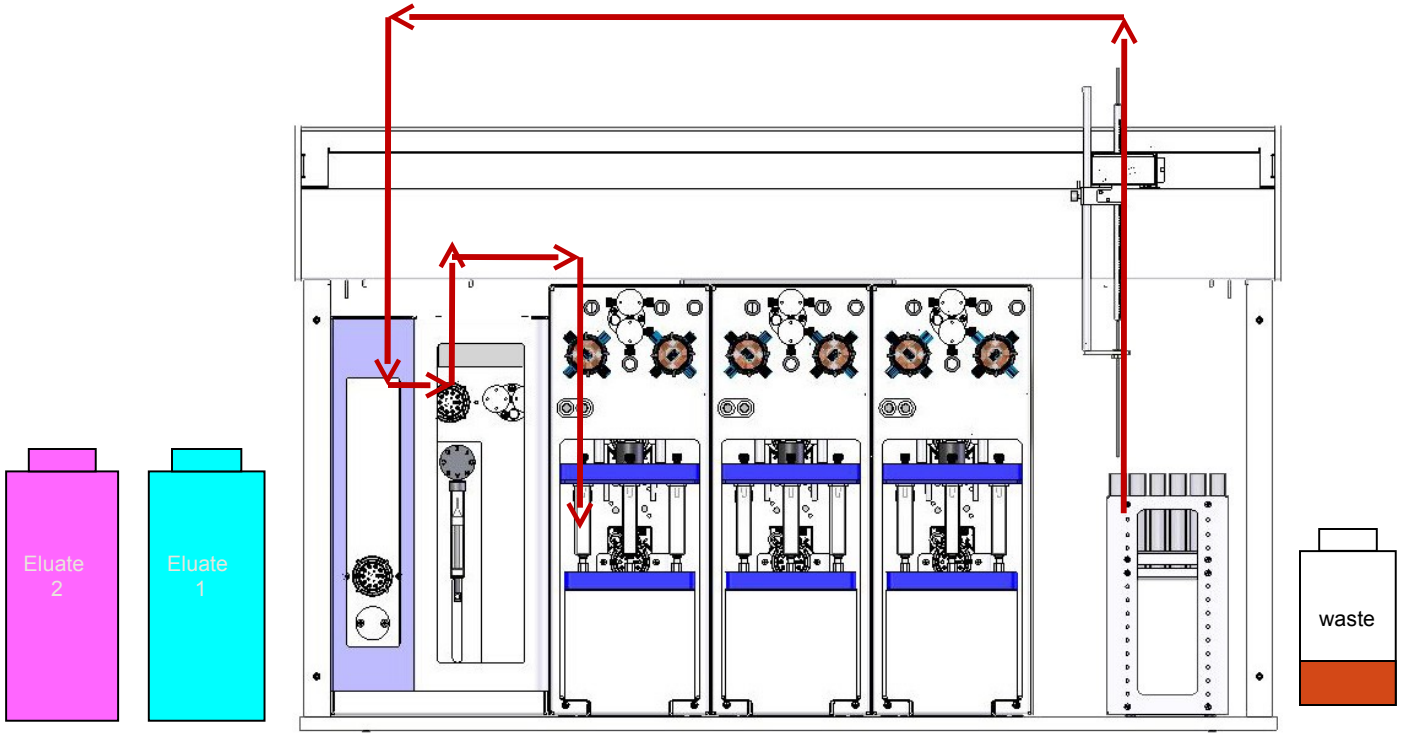
Example 1: Single Column Mode

Condition column



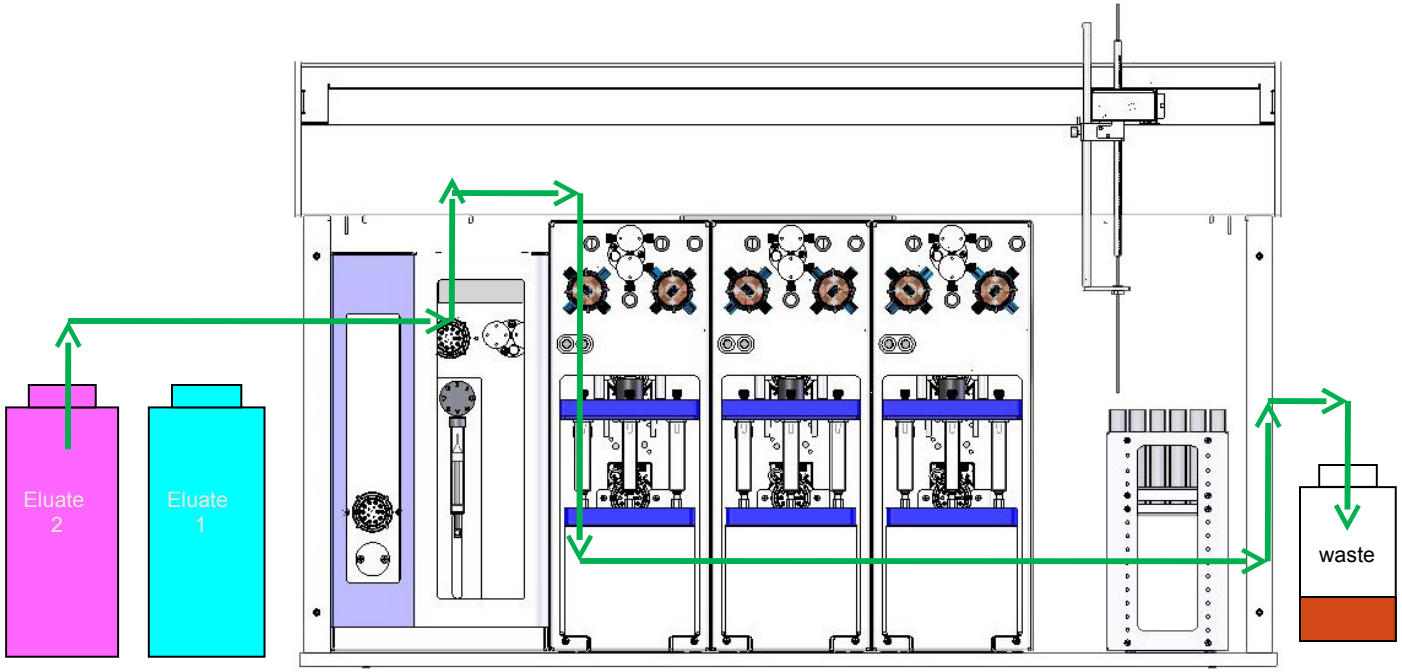
Example 1: Single Column Mode

Introduce Sample



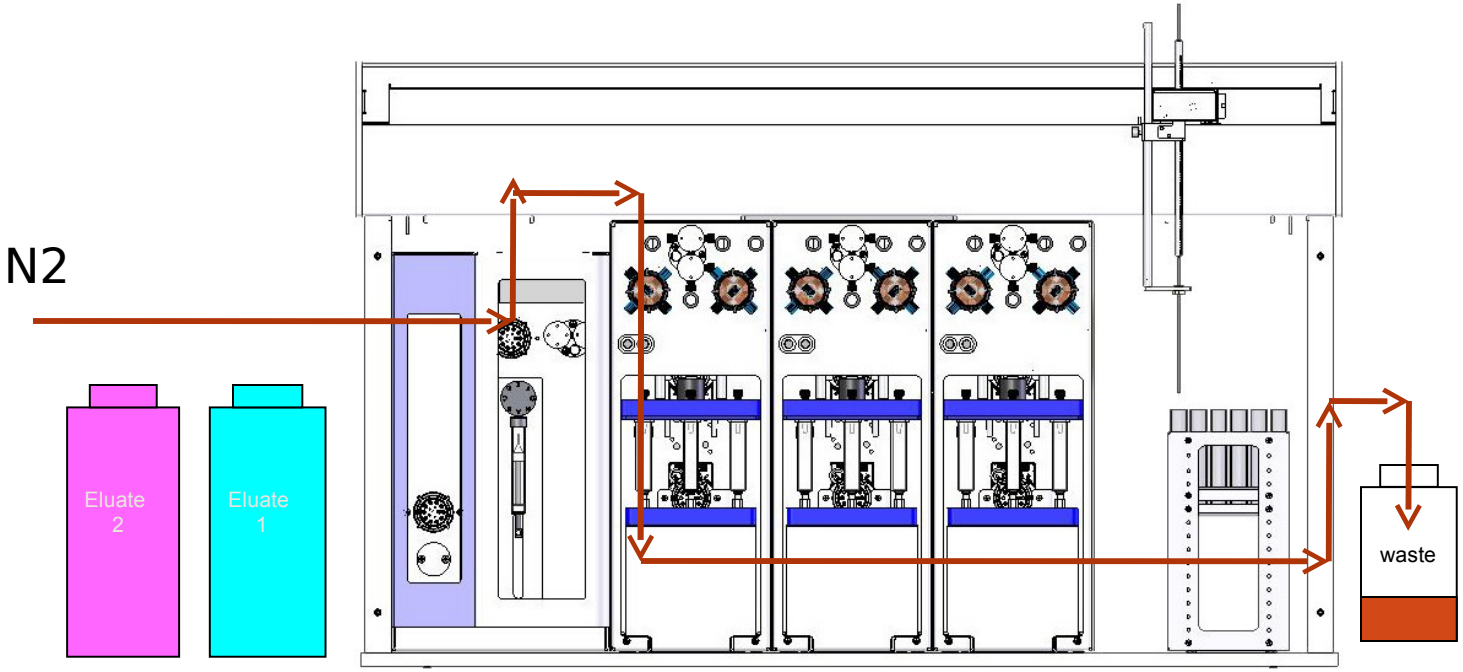
Example 1: Single Column Mode

Eluate interferents to waste



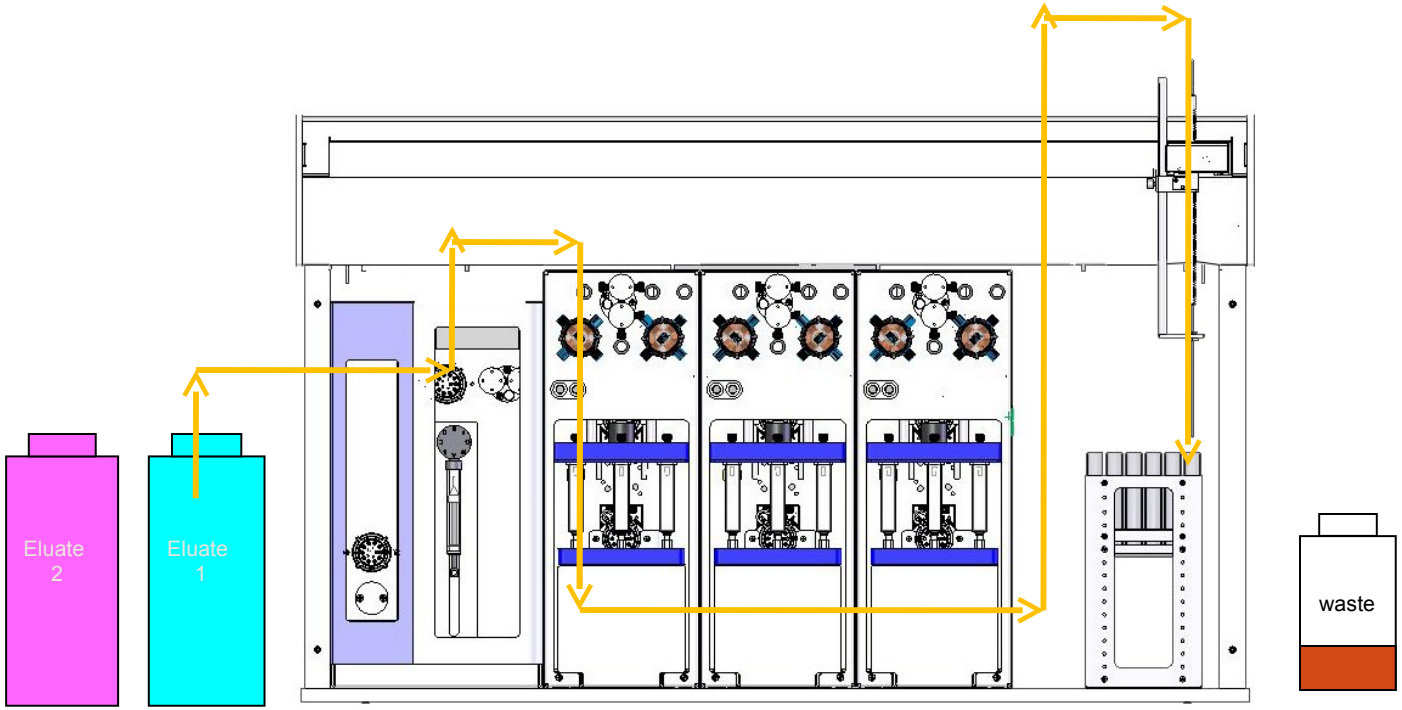
Example 1: Single Column Mode

N2 Drying of the Sorbent



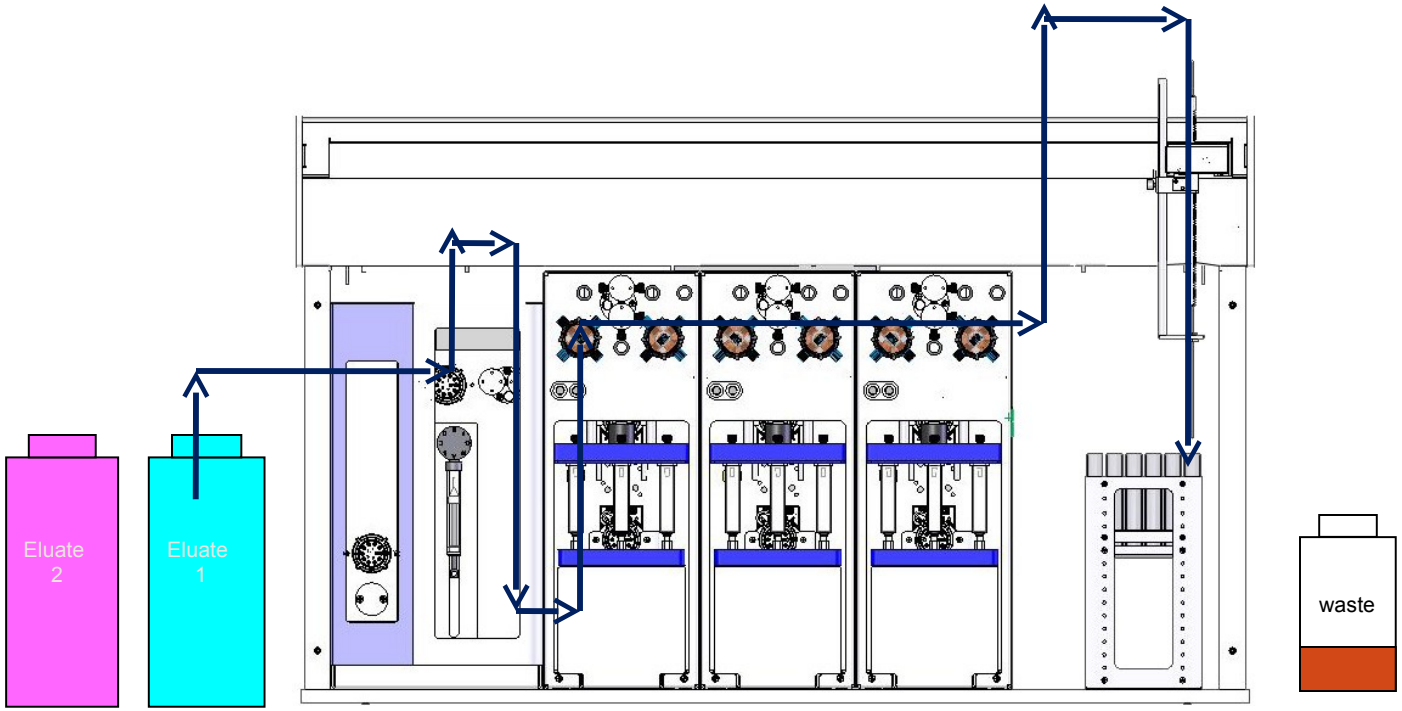
Example 1: Single Column Mode

Elute analytes to collect vial



Example 1: Single Column Mode

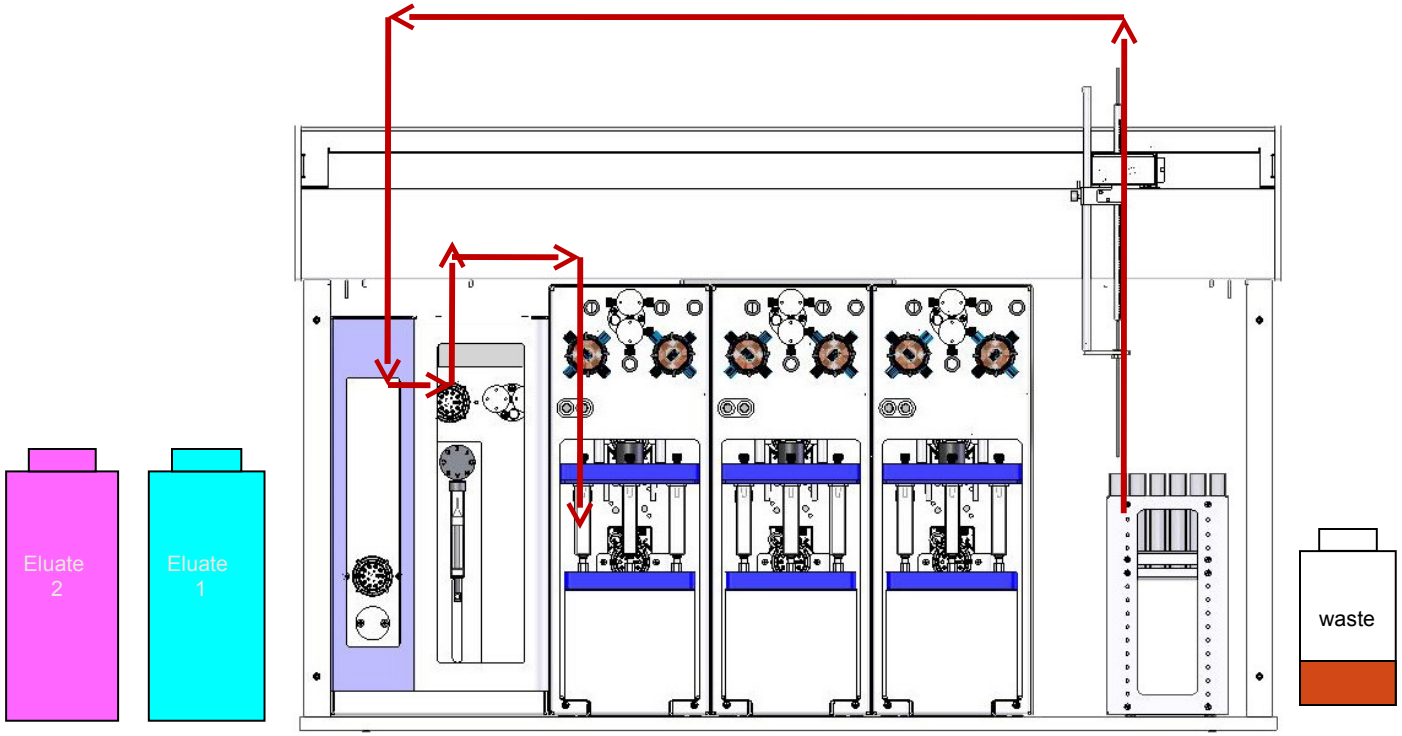
Reverse elute second fraction to collect vial



Example 2
Multi-column mode

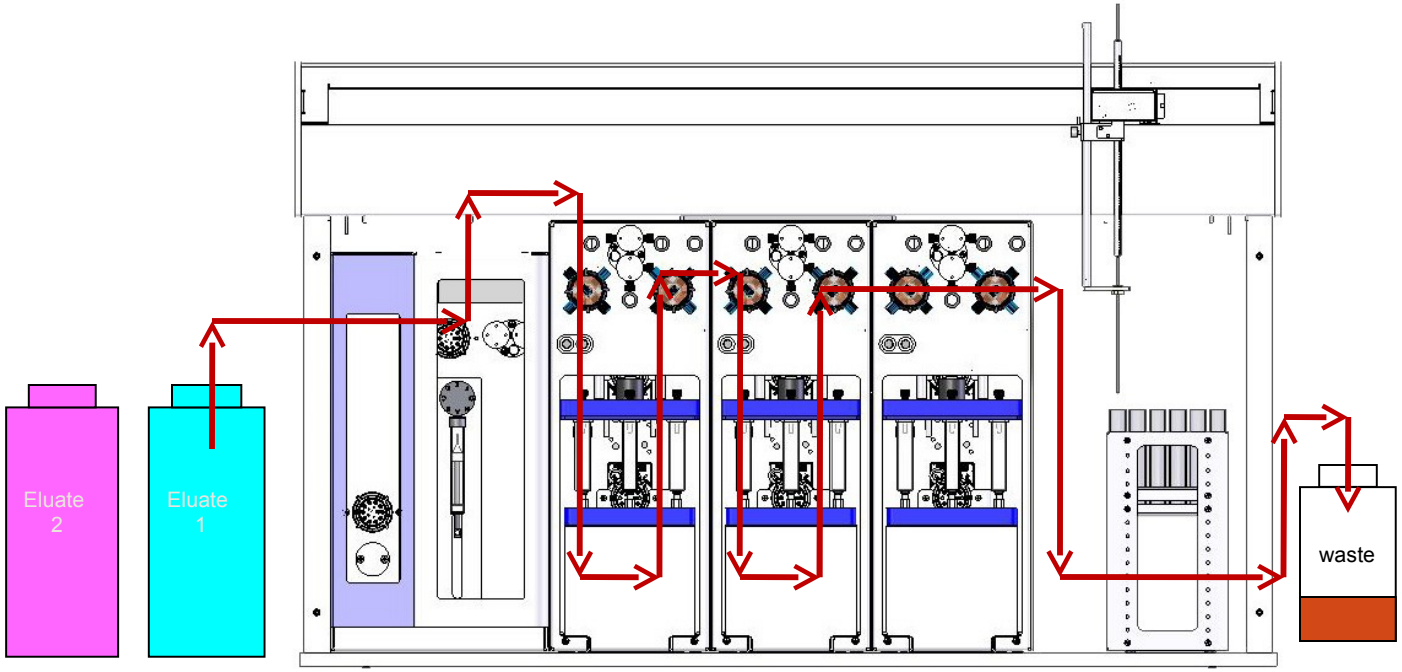
Example 2: Multi Column Mode

Introduce Sample



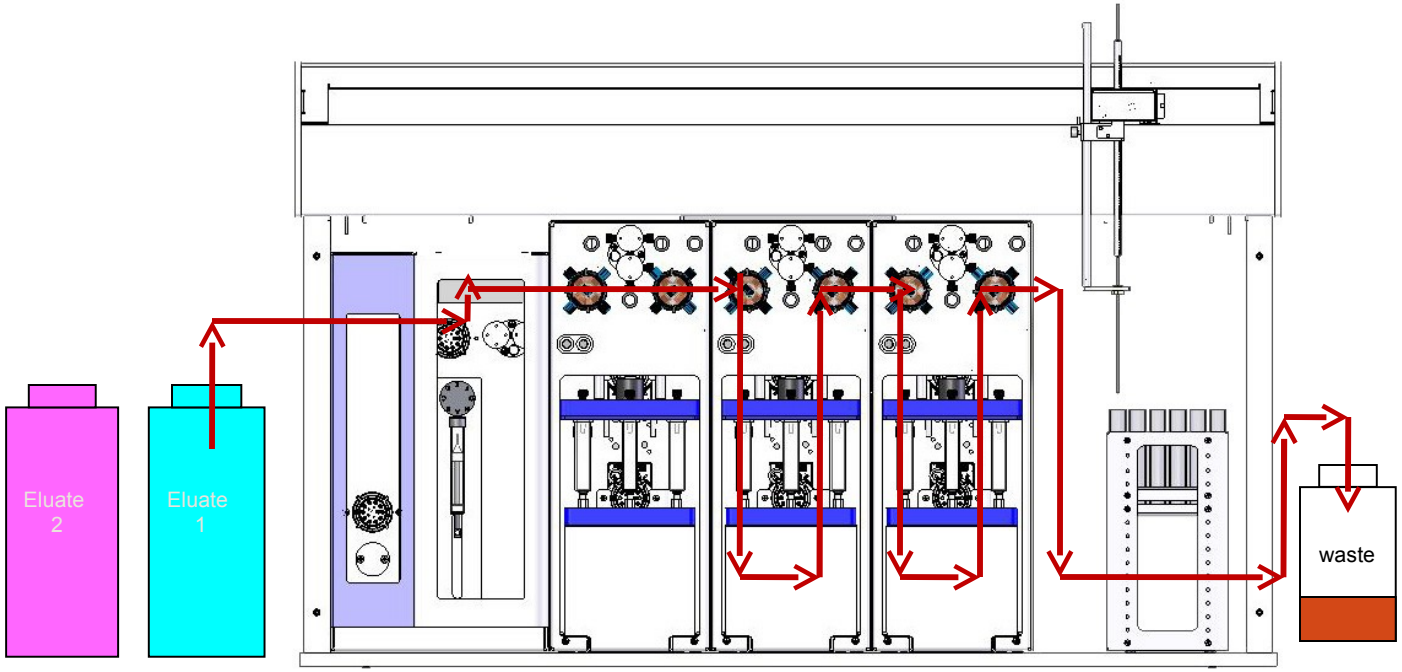
Example 2: Multi Column Mode

Elute sample from Module 1, Column 1 to Module 2, Column 1



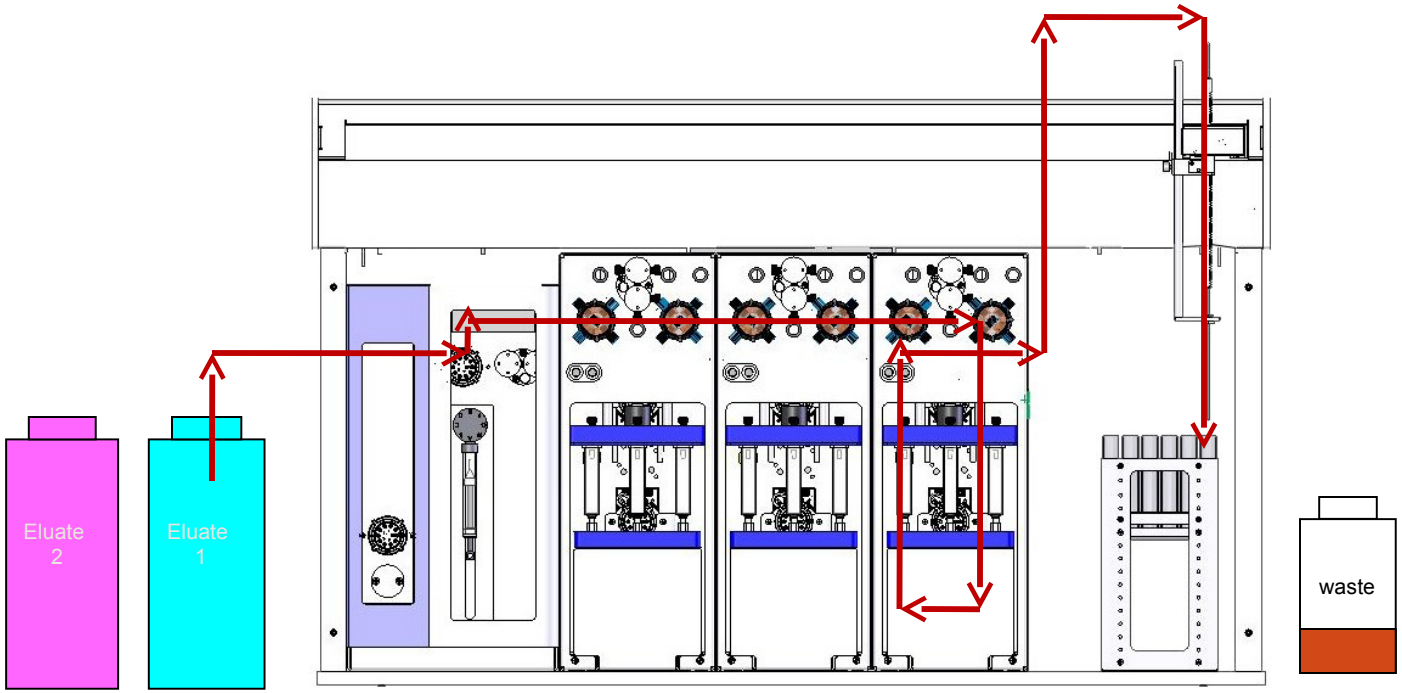
Example 2: Multi Column Mode

Elute sample from Module 2, Column 1 to Module 3, Column 1



Example 2: Multi Column Mode

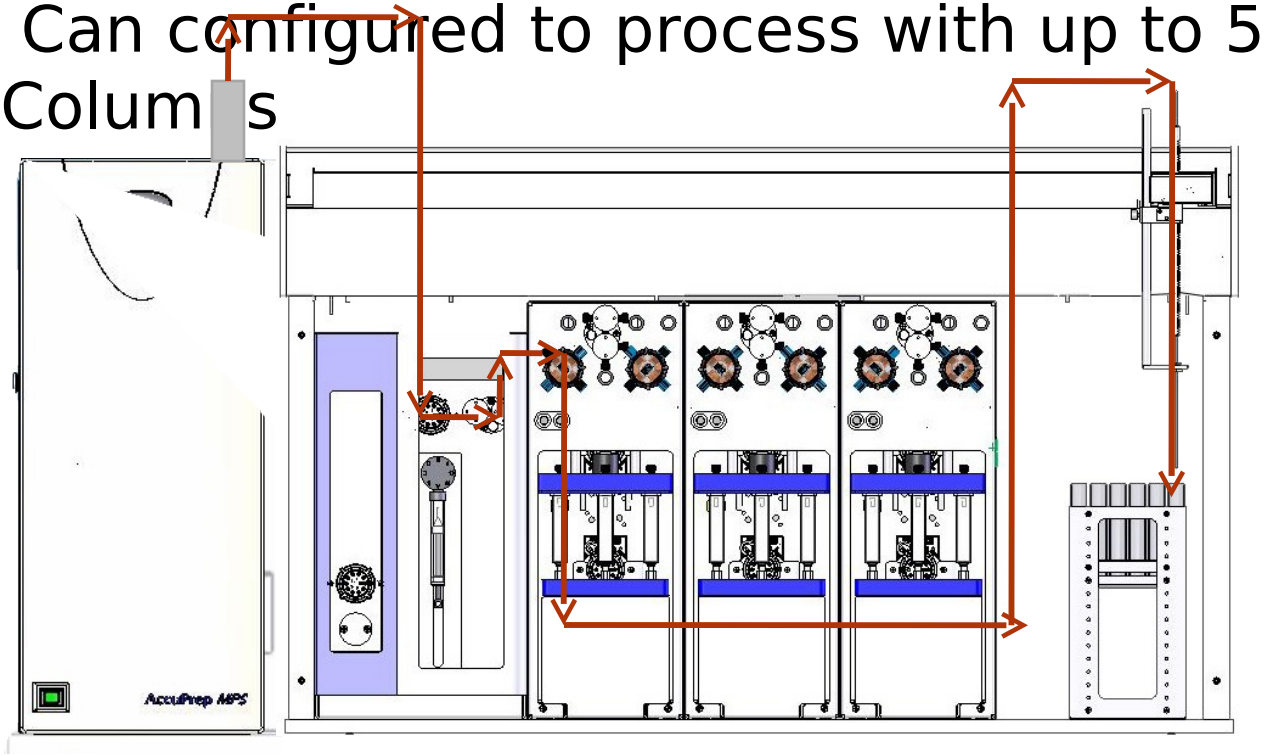
Reverse Elute sample from Module 3, Column 1 to Collect vial

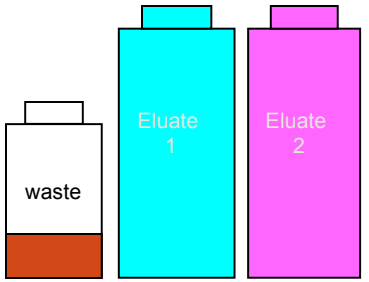


Example 3
GPC Cleanup with Inline SPE

Example 3: GPC Cleanup with SPE

- GPC cleanup collect fraction is introduced inline to SPE Column.
- Can configured to process with up to 5 SPE Columns

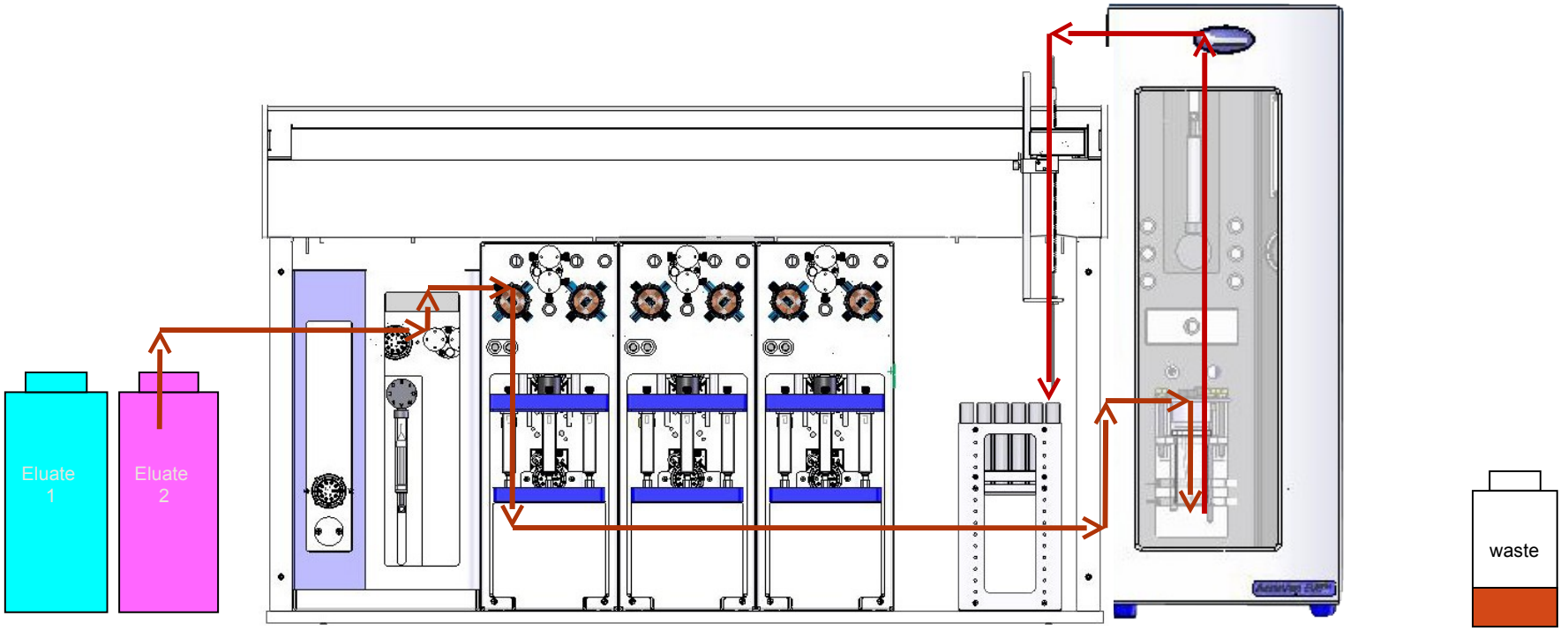




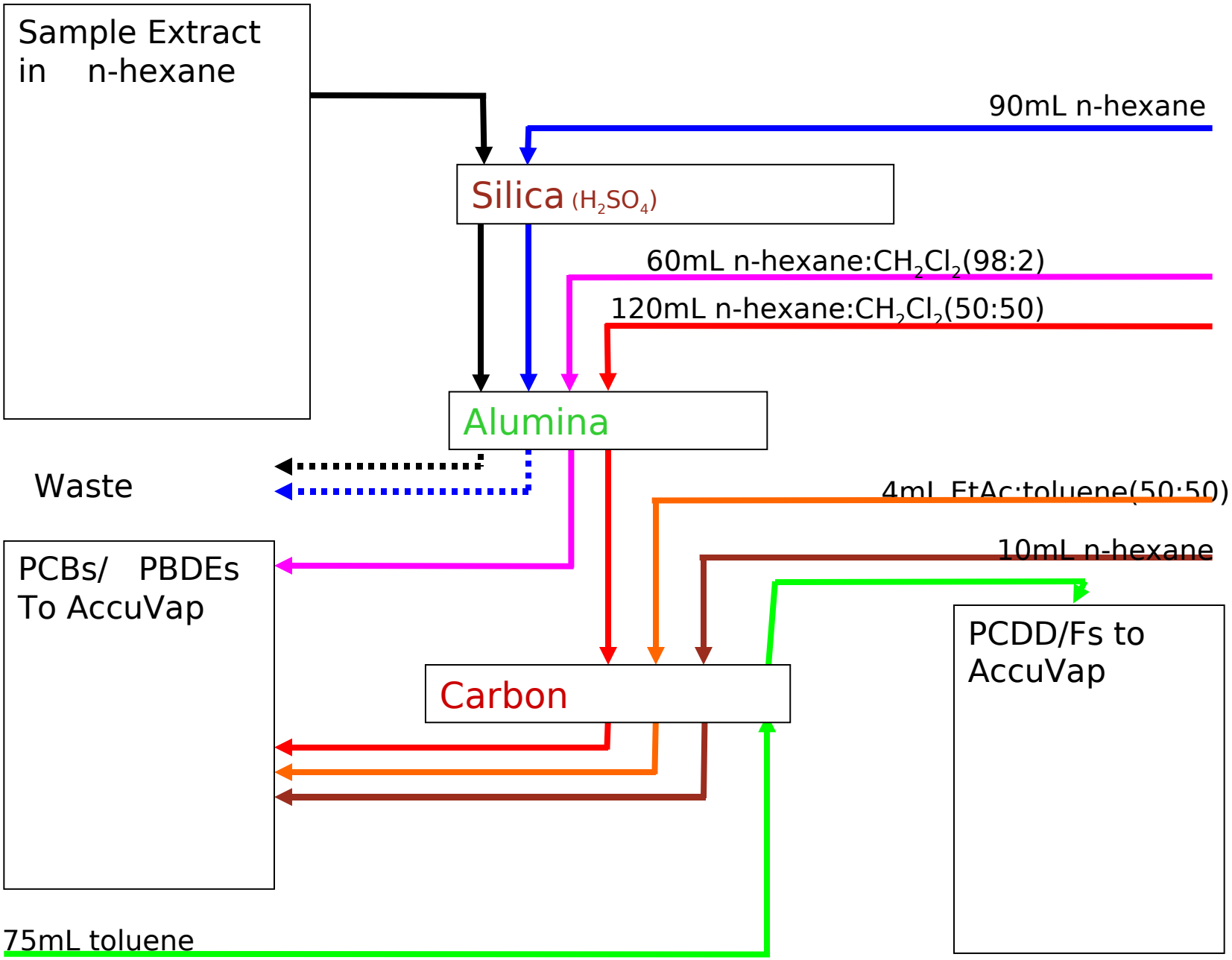
Example 4
SPE with AccuVap

Example 4: SPE with AccuVap

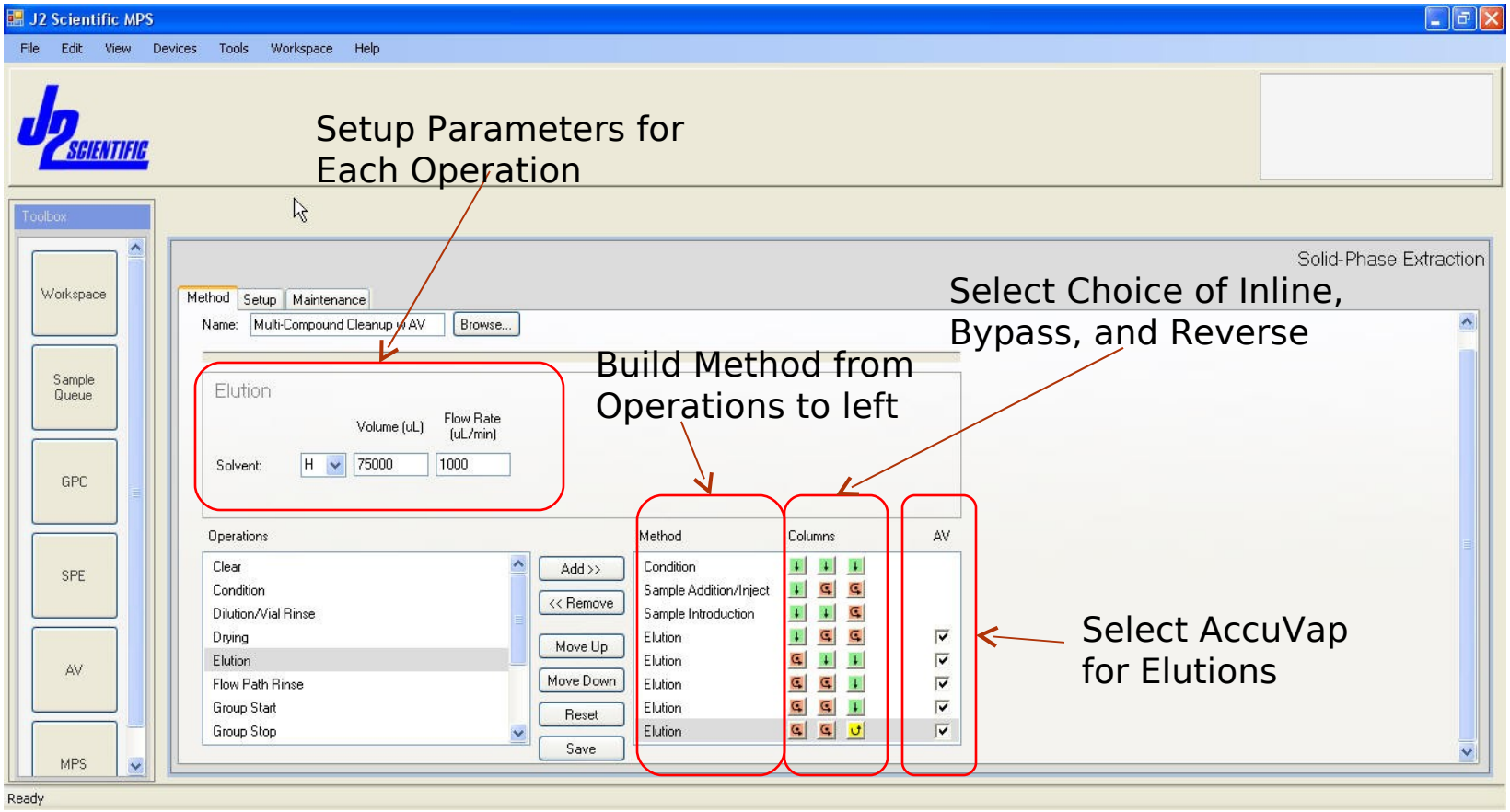
- SPE collect eluate is concentrated automatically inline
- Quantitated sample is delivered ready for analysis



Example Automated Multi-Compound-Cleanup



Program Multi-Compound Cleanup with AccuVap



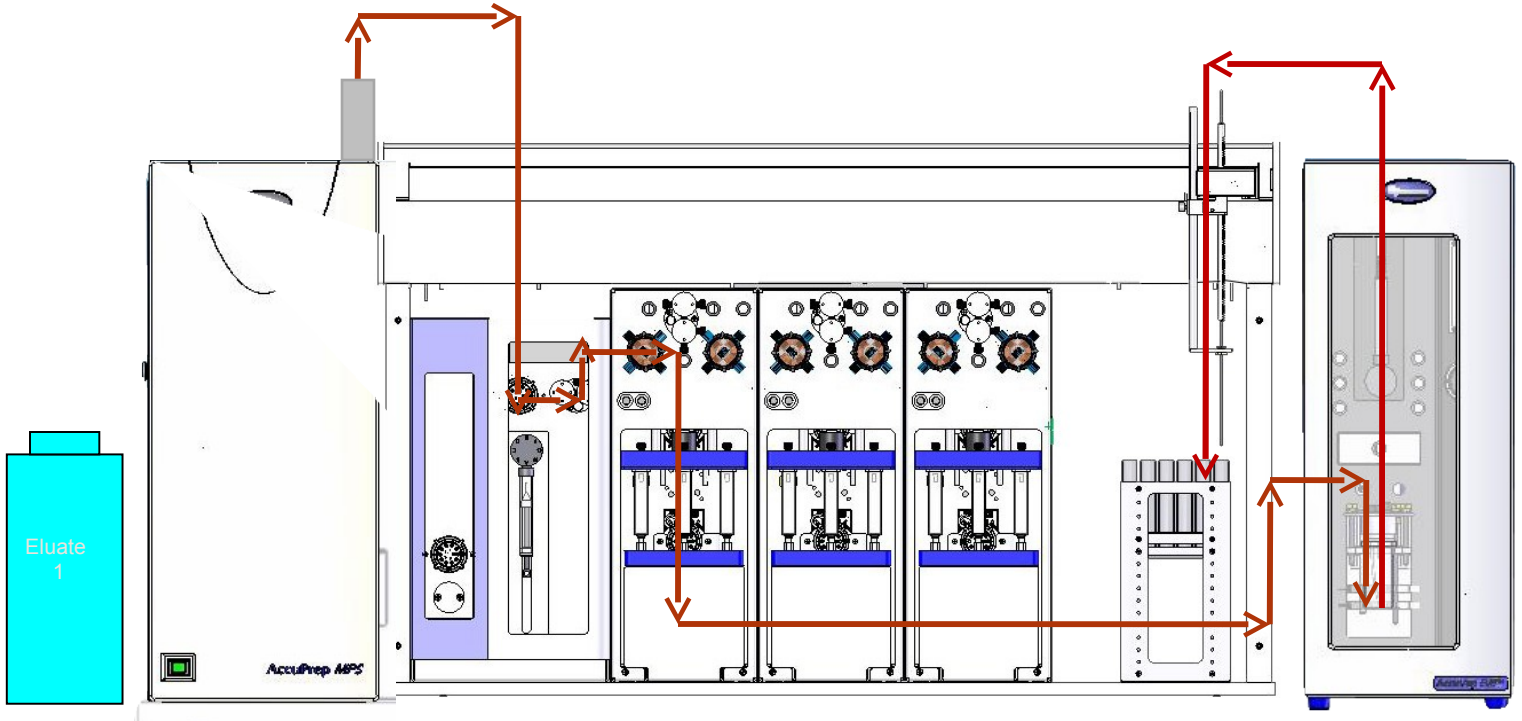
Example 5
GPC Cleanup with Inline SPE (2 fractions) and AccuVap

Plan:

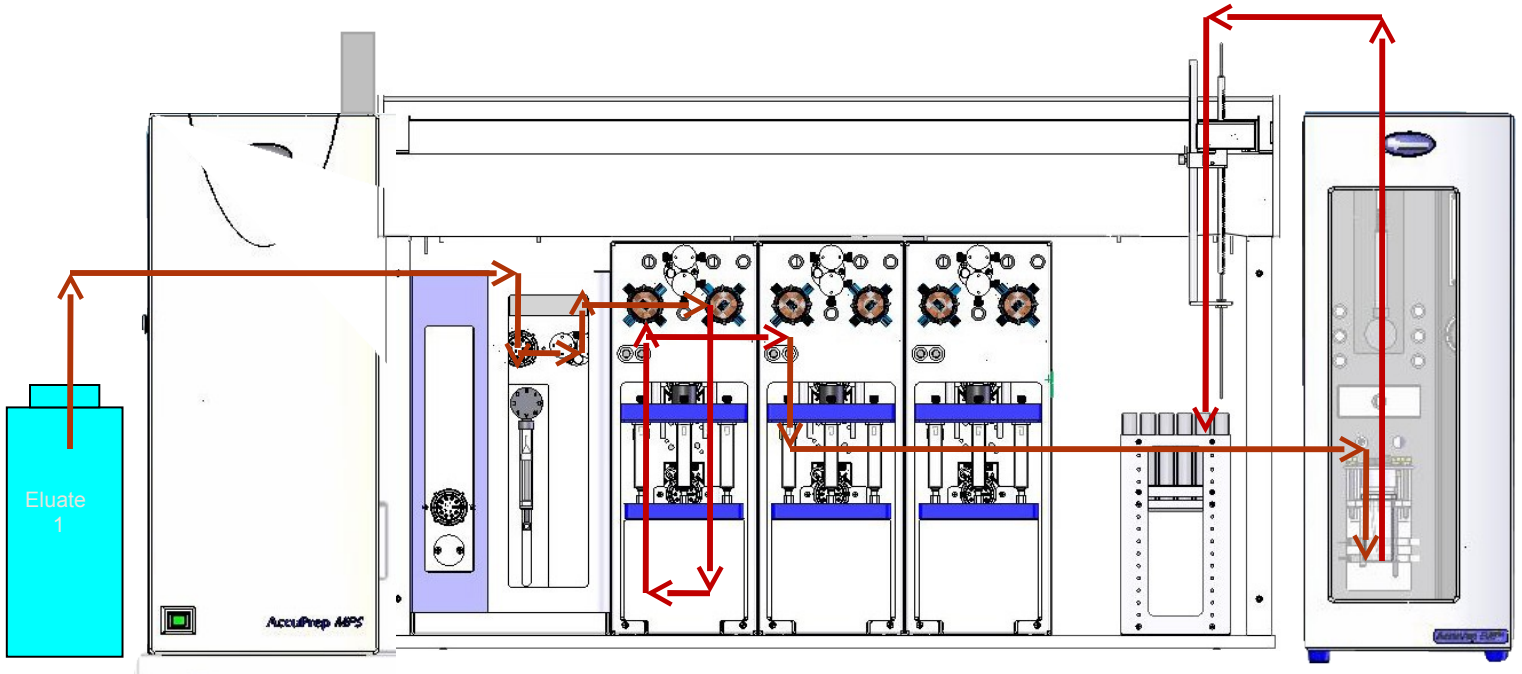
Cleanup of Soils and tissues by GPC Cleanup for Dioxins and Furans. Elute GPC Collect into Inline SPE Carbon to separate Planar and Co-Planar compounds. Planar compounds are retained on the Carbon. Co-Planar compounds pass to the AccuVap. Reverse elute with toluene through the carbon to elute the planar compounds into a separate collect fraction that can be directed to the AccuVap for concentration or to a collect vial.

- Method 1: GPC Cleanup with Inline SPE to AccuVap
- Method 2: Reverse Elute through SPE

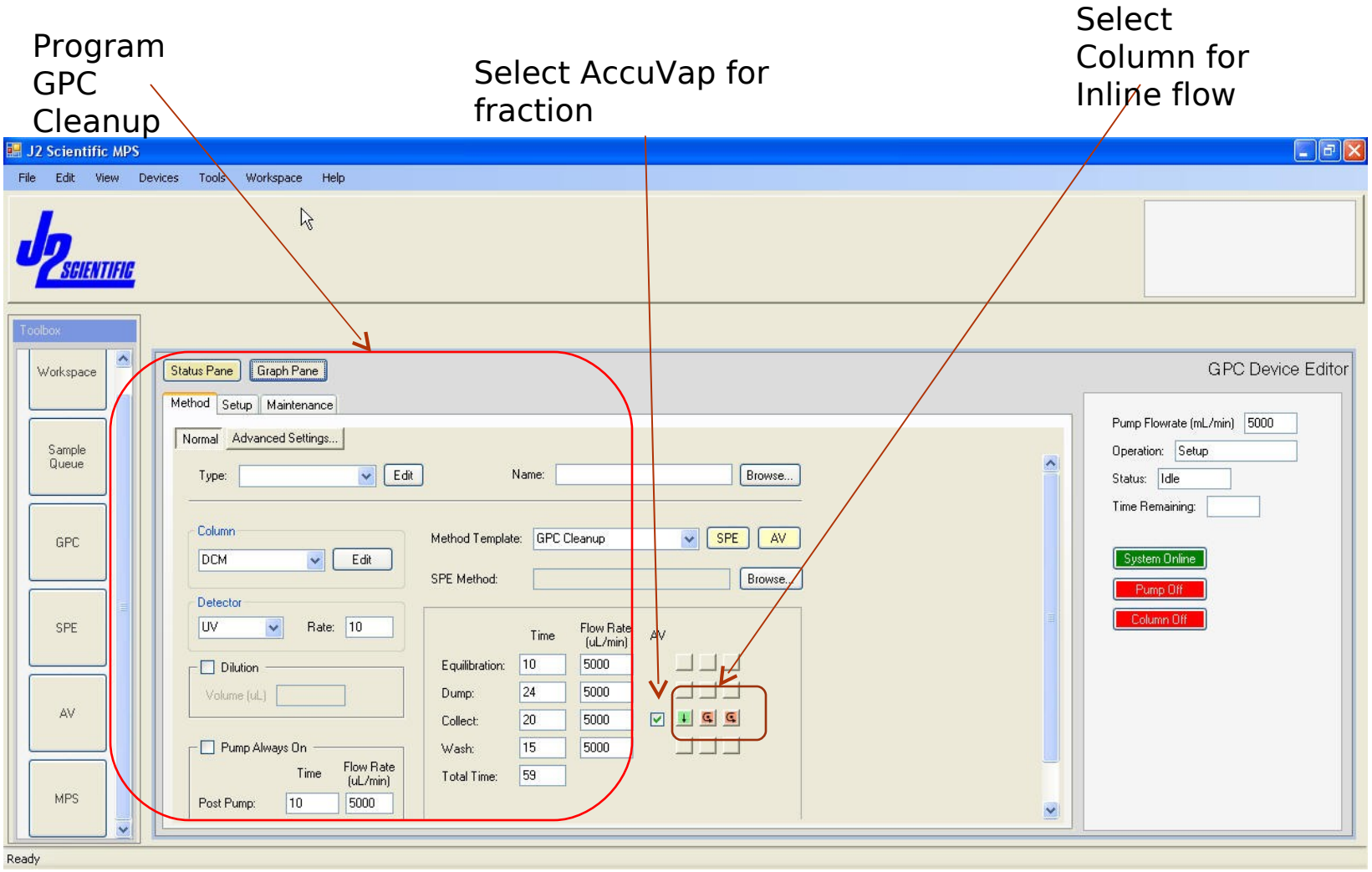
Method 1: GPC Cleanup with Inline SPE to AccuVap



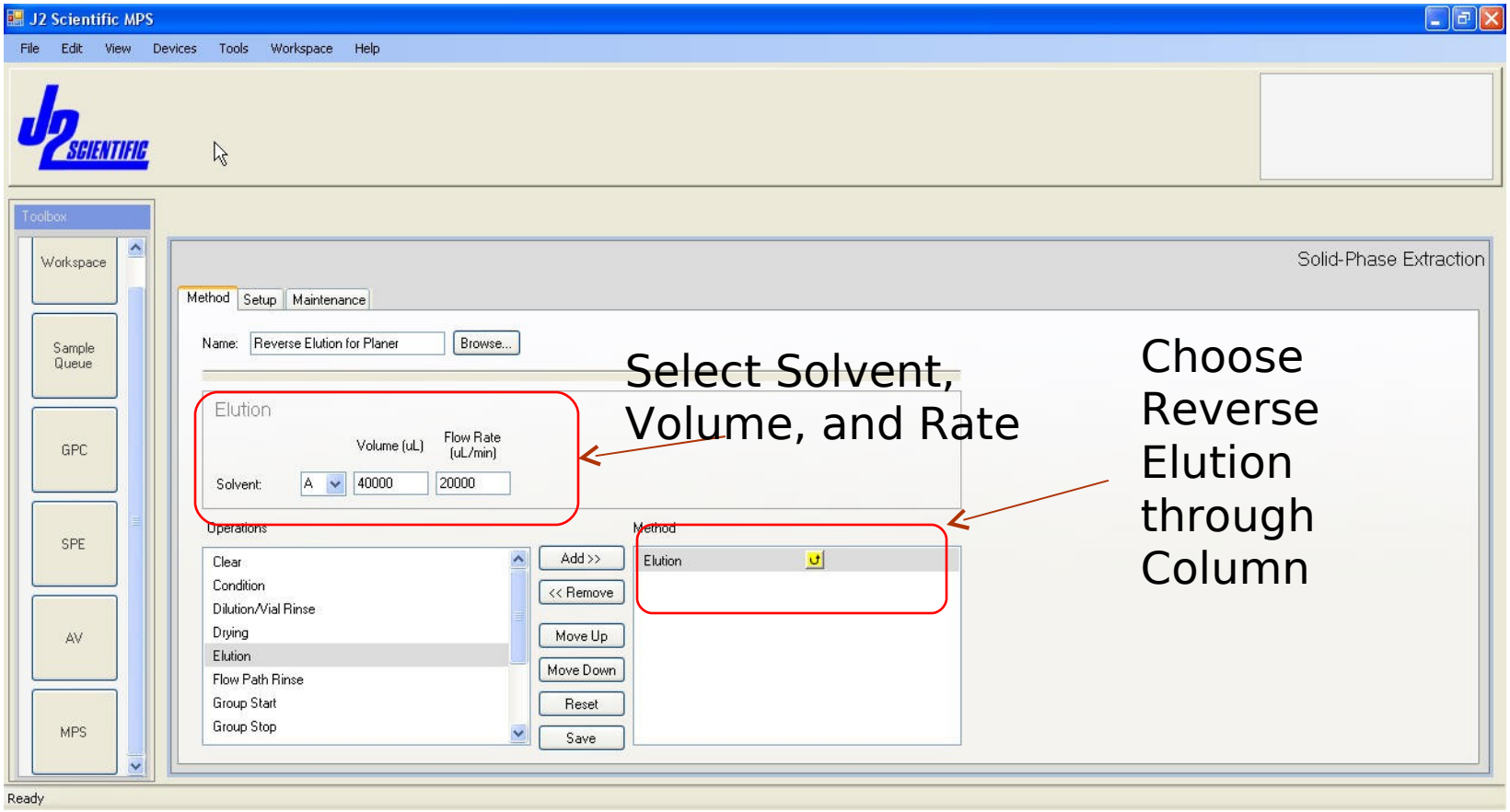
Method 2: Reverse Elute through SPE and concentrate in the AccuVap



Programming Method 1: GPC Cleanup with Inline SPE to AccuVap



Programming Method 2: Reverse Elute through SPE

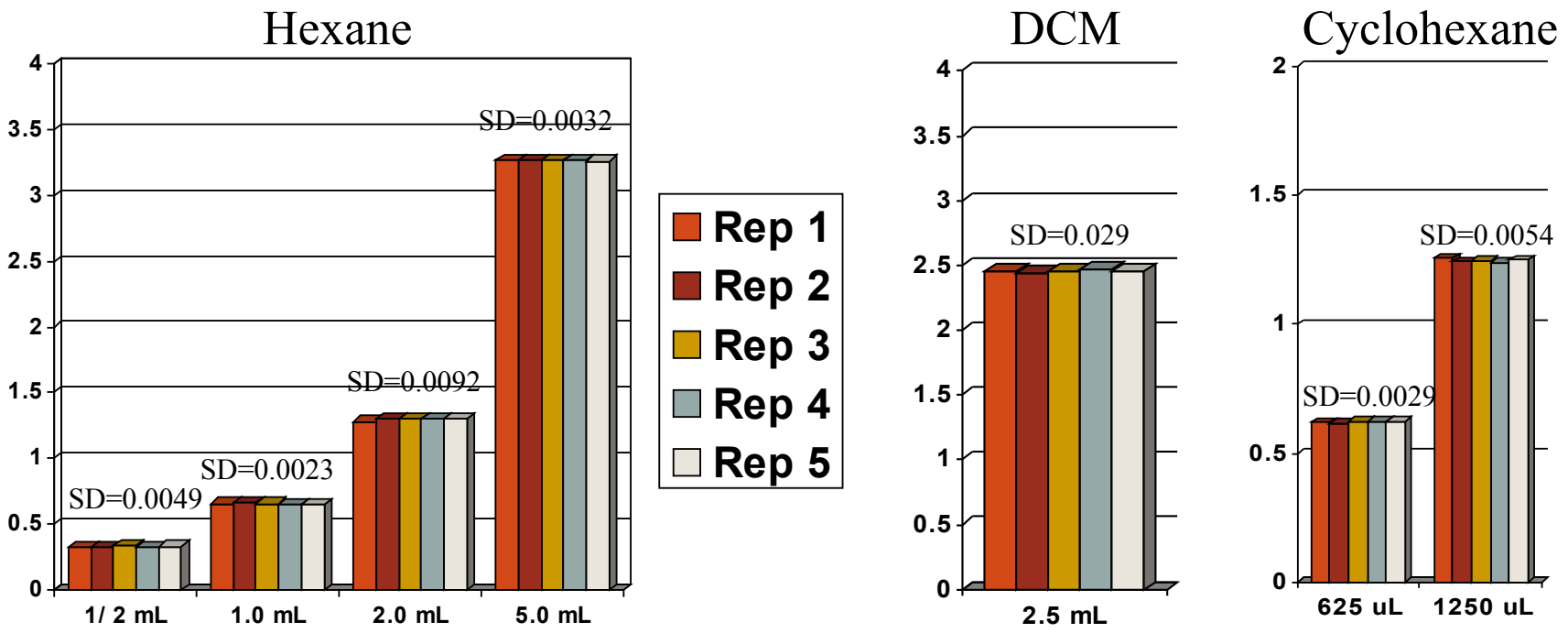


AccuVap Data

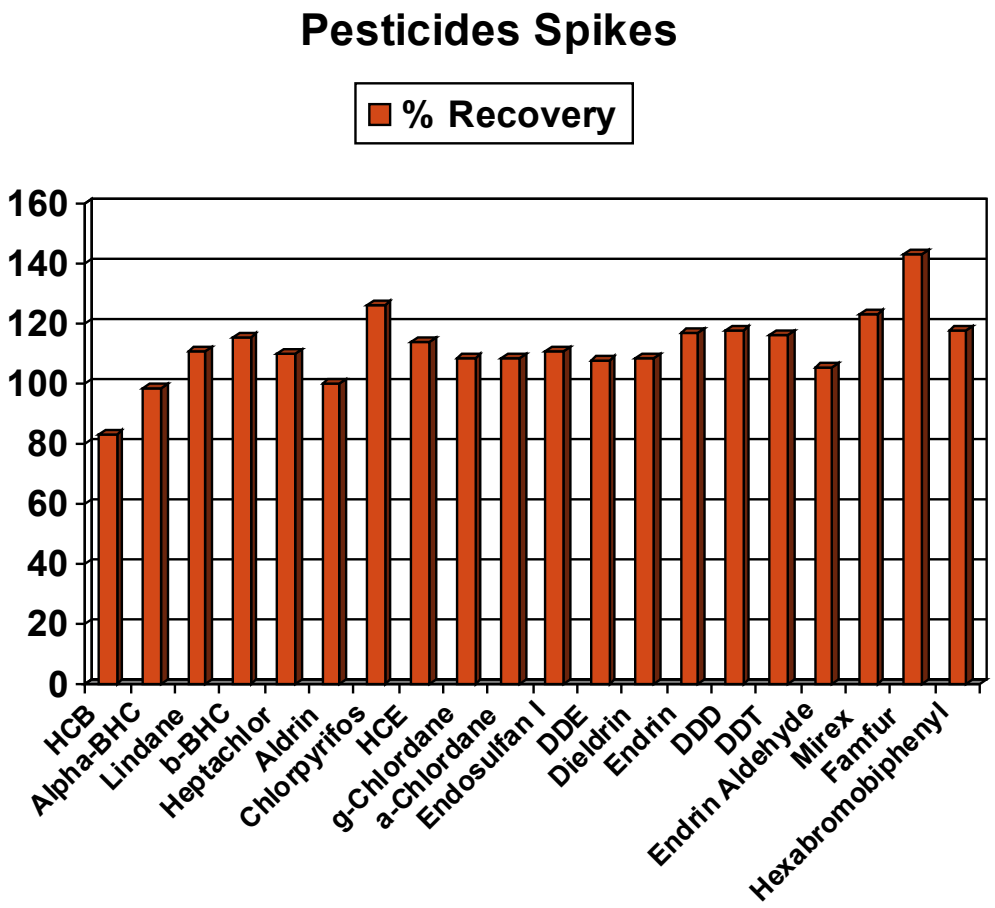
Precision & Recoveries

Diluent Addition Precision

- The precision of the diluent addition amount from sample to sample was determined gravimetrically.



AccuPrep MPS™ with AccuVap™ Recovery Data



AccuPrep MPS™ with AccuVap™ Recovery Data