PromoChrom Technologies

SPE-04 Solid Phase Extraction System

For Automatic and Online Cleanup of Biological Samples

About PromoChrom

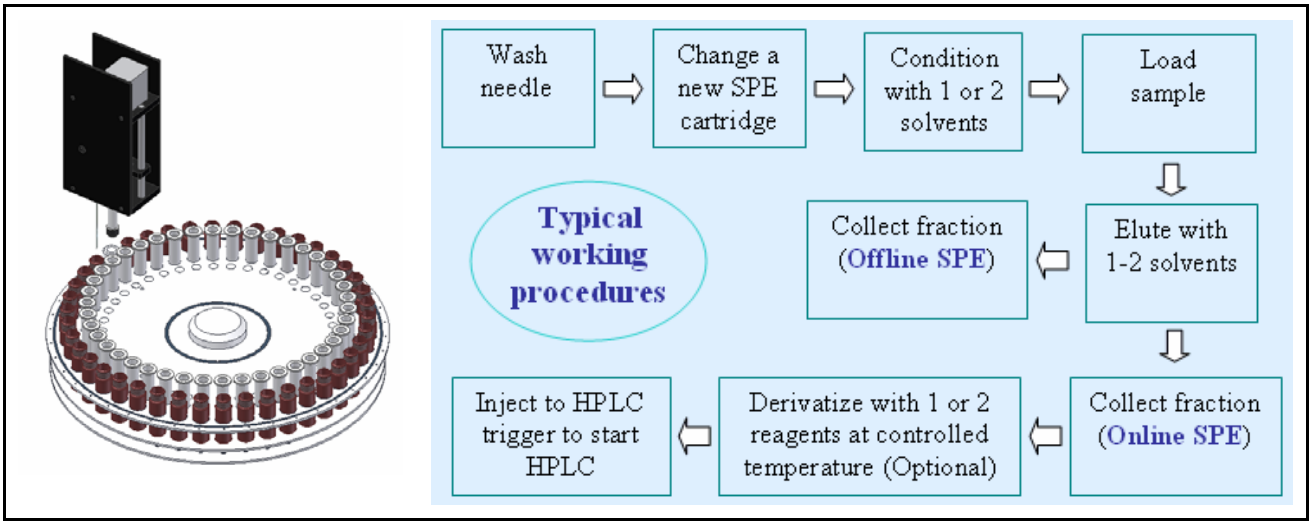
PromoChrom Technologies focus on development of sample preparation solutions for trace analysis. Since year 2005, PromoChrom have developed SPE-01 cleanup station, SPE-03 cleanup station, SPE-04 online/offline SPE, LC-04SP valve system and SPE-06 mini SPE. Each of the instruments are targeting specific applications. SPE-01 has been used for cleanup in analysis of pesticide residues and extractable petroleum pollutants in soil. SPE-03 has been used for water quality monitoring. LC-04SP has been used to build multi dimensional HPLC.

In 2011, PromoChrom developed flow-path-integration technique for liquid handling. The technique is based on ideas from integrated circuit and lab on a chip manufacturing. It combines various switching valves into one liquid handling module. The technique simplifies the structure of our instruments considerably, making the instruments more affordable and more reliable.

SPE-04 multi functional solid phase extraction system is a flexible and versatile platform for automatic sample preparation. It can perform multiple tasks: offline solid phase extraction, online solid phase extraction, normal sample injection, and online derivatization with controlled temperature. It is designed for automatic cleanup of biological samples (such as small molecules in plasma and urine samples). Compared to SPE-01, SPE-04 has smaller sample volume and fraction volume and can process much larger number of samples per batch.

1. Working principle of SPE-01

The following diagrams describe the structure and typical working procedures of SPE-04. The plunger for SPE column can seal the column well. It can work with SPE columns from most suppliers. There is no need for a special cap or adapter.



2. Features

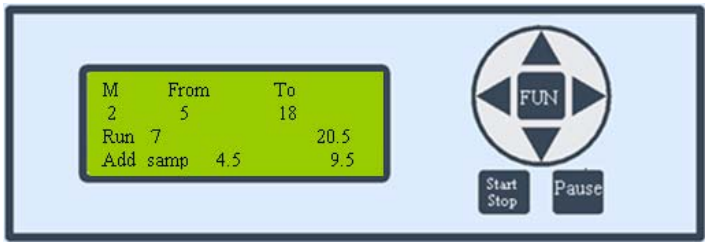
2.1 Multi funtional platform

Depending on the configurations, a SPE-04 can perform offline solid phase extraction, online solid phase extraction, online derivatization, and direct injection to HPLC. The online derivatization function is very useful for analysis of amino acids, hormones, and some pesticides.

2.2 Easy operation

SPE-04 uses built-in methods to do offline SPE. It doe not need a computer. The operation of instrument involves only 7 buttons. Below is a typical routine operation procedure:

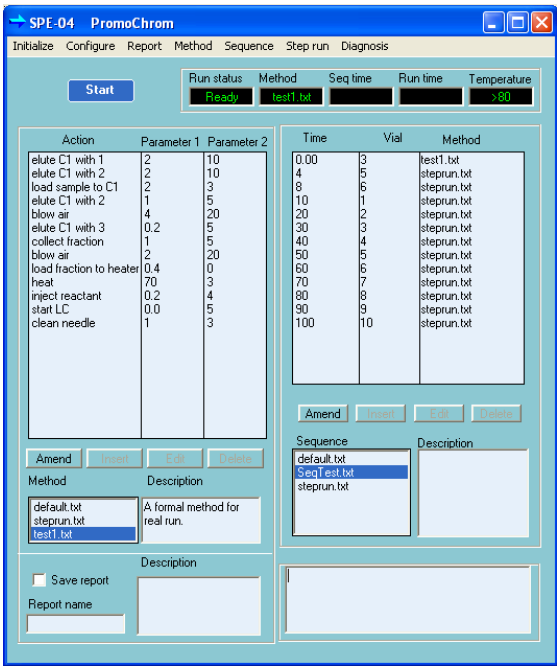
- Place sample and columns on the tray
- Select samples to be processed
- Select method
- Press the start/stop button.



The screen indicates samples 5 to 18 are to be processed using method 2. It is now processing sample 7. The total volume per sample is 20.5 mL. Currently the instrument is performing add sample action.

The instrument will process the samples automatically according to the selected method.

In online mode, the collected fraction is directly injected into an HPLC or LC-MS for final determination. The control software for online SPE is user friendly and is compatible with most HPLC software. The software uses methods and sequences for the automation. It has similar structure as Agilent Chemstation. Users of HPLC can easily understand the SPE-04 software.

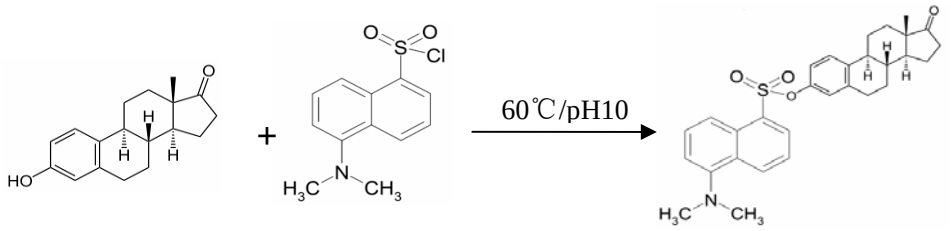


The software can perform overlapped injection. When HPLC is performing an HPLC run, SPE-04 can start processing the next sample.

3. Application example

Direct analysis of hormone in plasma sample:

1) Dilute plasma sample with 1% phosphoric acid at 1:5 ratio
2) Precondition a 3-mL/200-mg C18 SPE column with 2 mL methanol followed by 2 mL water
3) Load 2 mL sample and wash with 4 mL water+methanol (80:20)
4) Wash SPE column using methanol and collect 1 mL fraction
5) Derivatize the fraction with dansyl chloride at 60 ^{o}C
6) HPLC analysis using a PCTsil C18 column and UV or fluorescence detection.



Estrone Dansyl chloride

4. Specifications

	Offline modle	Online model
Sample capacity	18, 26 or 38 per batch	18, 26 or 38 per batch
Maximum sample volume	4, 8 or 20 mL	4, 8 or 20 mL
Material of wetted parts	Teflon, stainless steel, Pyrex glass	Teflon, stainless steel, Pyrex glass
System control	Micro controller with LCD and keypad	Computer or micro controller with LCD and keypad
Method functions	Pre condition, load sample, elution with 5 solvents, fraction collection	Pre condition, load sample, elution with 5 solvents, blow dry of sorbent, fraction collection, injection into HPLC.
Temperature for derivatization		Ambient to 80 ℃
Type of derivatization reagent		2
Pump flow rate	1 to 30 mL/min	1 to 30 mL/min
Pressure limit of pump	6 bar	6 bar
Pump reproducibility (C.V.%)	<1.5	<1.5
Power supply	24 VDC	24 VDC
Current	< 1 A	< 1 A
Weight	12 Kg	12 Kg
Dimension (cm)	34 x 42 x 35 cm (width x depth x height)	34 x 42 x 35 cm (width x depth x height)

5. Order information

Part No.	Description	Price (US$)
SPE-04-01	Includes SPE-04 offline mainframe (no online SPE function), 24V power supply, and user manual	
SPE-04-02	Includes SPE-04 mainframe, sample injection module for HPLC, control software, remote cable for HPLC, 24V power supply, and user manual.	
SPE-04-03	Includes SPE-04 mainframe, sample injection function for HPLC, online derivatization module, and control software, remote cable for HPLC, 24V power supply, and user manual.	

PromoChrom Technologies Ltd
212-10951 Mortfield Road
Richmond, BC V7A2W5, Canada
Tel: (+1)-6042950280
Email: info@promochrom.com
www.promochrom.com