TRAJAN

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MAKING CONNECTIONS TO AUTOMATION

CHRONECT™ Workstation PFAS

Science that benefits people

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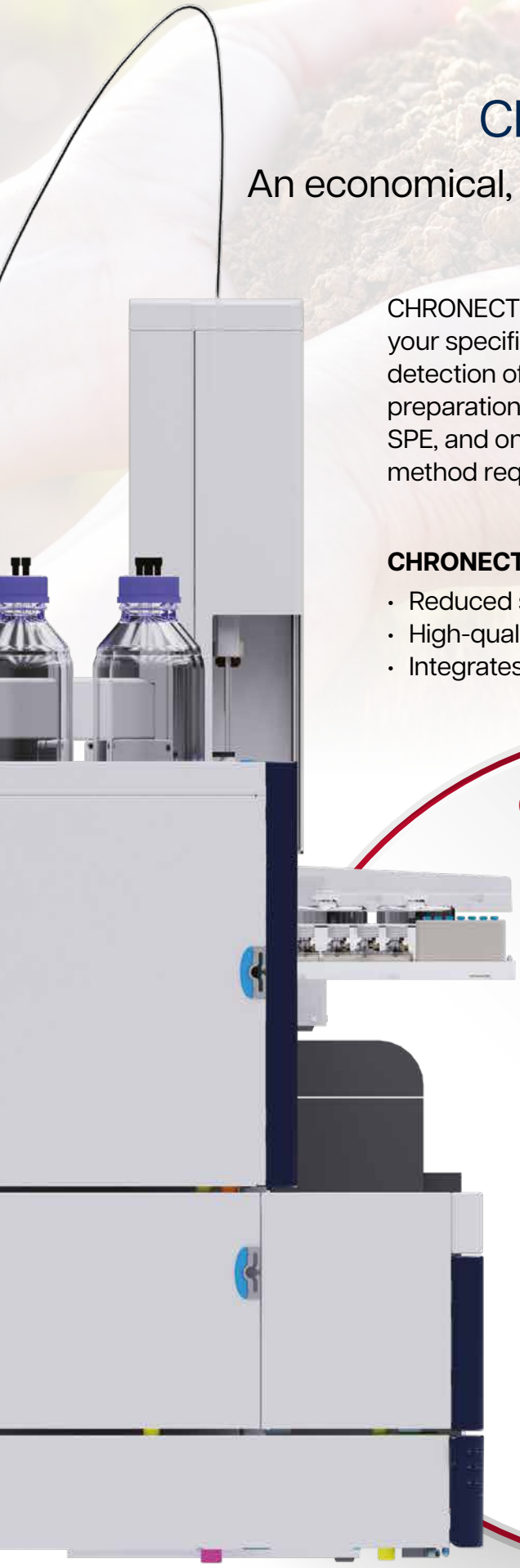
CHRONECT by TRAJAN

CHRONECT™ Workstation PFAS

An economical, flexible, efficient lab automation system

[US EPA1633] Soil



CHRONECT™ is built to your needs, using modular components to suit your specific workflow. The CHRONECT Workstation PFAS improves detection of PFAS in soil by automating and streamlining the sample preparation process. It encompasses solid-liquid extraction, dispersive SPE, and online SPE LC-MS/MS, in compliance with the US EPA 1633 method requirements for aqueous and solid samples.

CHRONECT offers cost savings and a competitive advantage, with:

- Reduced solvent usage and faster analysis time per sample.
- High-quality samples, delivering high customer satisfaction.
- Integrates with your existing mass spectrometer system.

CHRONECT benefits

Savings

- Reduces the use of solvents by 80%.†
- Improves productivity by reducing the need for manual handling of the sample.†
- SPE cartridge can be used once or multiple times.
- Investment payback of under 12 months. ††

† Compared to manual vacuum assisted SPE.
†† Actual payback is based on sample throughput.

Performance

- Fully automated from sample preparation to injection.
- Peak focusing for improved chromatography separation.
- Decreased Mass Spectrometer source maintenance intervals.
- Closed system reduces cross sample contamination.

Flexible

- Easily implemented adjustments to the workflow are possible with CHRONOS™ software. The hardware tools and modules are customizable to meet ever-changing requirements.

Compatible

- System-agnostic CHRONOS software interfaces with multiple vendor LC-MS configurations and LIMS systems.

Throughput

- SPE is RFID tagged, so each cartridge is tracked for usage.
- Prep and load approach minimizes LC-MS idle time and matches the LC method timeframe.

HPD

High-Pressure-Dispenser

- Syringe pump connected to ACE and injection valve; delivers solvents and sample through cartridges, elutes the cartridge in peak focusing mode for PFAS analysis.
- Equipped with WAX-online trap between HPD and injector for cartridge wash/condition/load.

CHRONECT PAL3

160 cm Dual Head PAL

- Automated sample preparation prior to online SPE LC-MS/MS and autosampler for direct and SPE injections.
- Equipped with a variety of tools and modules, that are configured individually to meet the requirements of PFAS analysis: e.g., vortexer to resolubilize analytes prior to injection, PTFE tubing-free solvent modules and wash stations; automated extraction of solid samples, etc.

COLUMN OVEN

Mistral™ Column Oven

- ProteCol® C18 H125 150 mm x 2.1 mm

MS

Triple Quadrupole Mass Spectrometer

ACE

Automated Cartridge Exchanger

- Places cartridges in flow path and returns them into tray; 4 high-pressure valves set the flow path.
- Cartridges: Polymer WAX, ~3 mg sorbent material; 10 x 1 mm; housing material: PEEK.

PUMP

SPH1299 Pump

- Analytical pump running the LC gradient.
- Can elute the cartridge depending on flow path setting; in peak focusing mode for PFAS analysis LC gradient merged with cartridge elution flow.
- PTFE eluent tubings + filters replaced with PEEK tubings and stainless-steel frits, WAX-online trap instead 'classic' delay column.

System operation steps

First: Weighing

2 g sample of soil is weighed into a 20 mL headspace vial

Second: Automation extraction

1

INTERNAL STANDARD ADDITION

1 mL of ultrapure water is added to the soil to wet the soil matrix and suspend the sample, extracted internal standard solution (EIS-solution) is added to the suspension.

2

EXTRACTION 1

4 mL 0.3% ammonium hydroxide in methanol are added to the sample; extraction for 30 min in vortex mixer. The separation of supernatant by centrifugation and the supernatant transferred into new 20 mL vial.

3

EXTRACTION 2

6 mL 0.3% ammonium hydroxide in methanol is added to the sample with extraction for 30 min using the vortex mixer. The sample is then centrifuged and the supernatant combined with the first supernatant.

4

EXTRACTION 3

2 mL 0.3% ammonium hydroxide in methanol is added to the sample with extraction for 1 min using the vortex mixer. The sample is then centrifuged and the supernatant combined with the first and second supernatant.

5

CLEANUP

A 6 mL aliquot of the combined sample is transferred to a vial containing a dispersive carbon material. This sample is vortexed for 5 min. The sample is then centrifuged and neutralized with 10% formic acid.

6

FILTRATION

The extract is filtered through a 0.2 µm polyether sulfone (PES) filter. An 800 µL aliquot of the filtered extract is transferred into a 1.5 mL vial and mixed with 800 µL of ultrapure water. The sample is ready for the online SPE cleanup.

Third: Online SPE

7

CLEAN

The selected SPE cartridge is picked by the gripper of the automated cartridge exchanger (ACE) and placed into left clamp. The cartridge is cleaned, conditioned and equilibrated with 2% ammonium hydroxide in methanol and 0.3 Molar formic acid, respectively, and delivered from the high-pressure dispenser (HPD).

8

LOAD

The sample is loaded into loop of PAL injection valve and the injection valve switches into inject-position and sample is pushed through onto cartridge with ultrapure water via HPD.

9

ELUTION

Flow path and cartridge are washed with 0.1 Molar formic acid: ultrapure water (1:1) and the loaded cartridge is transported to the right-side clamp for elution. The cartridge is eluted with 2% ammonium hydroxide in methanol and merged into the LC flow towards column.

10

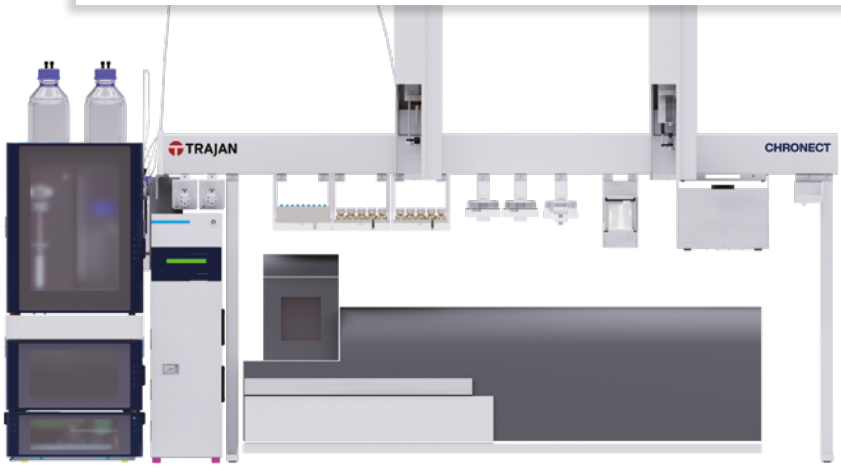
ADDITION OF INTERNAL STANDARD

The non-extractable internal standard solution is added to the column flow simultaneously as the sample is eluted into the LC flow to the analytical column.

11

ANALYSIS COMMENCES

The LC injection is completed, and the LC gradient analytical analysis commences, the compounds of interest are separated and quantified a triple-quadrupole mass spectrometer.



Return on investment

The CHRONECT Workstation PFAS can help reduce costs for laboratory managers by decreasing solvent usage and increasing the turnaround time for sample analysis, compared to traditional cartridge-based manual SPE cleanup methods.

Operating on CHRONOS software, the CHRONECT Workstation PFAS features a multi-system, time-based control mechanism that seamlessly integrates with LC-MS chromatography data software. This integration facilitates precise control over sample preparation, sample overlap timing, and data collection. The software is compatible with a wide range of LC-MS systems available in the market.

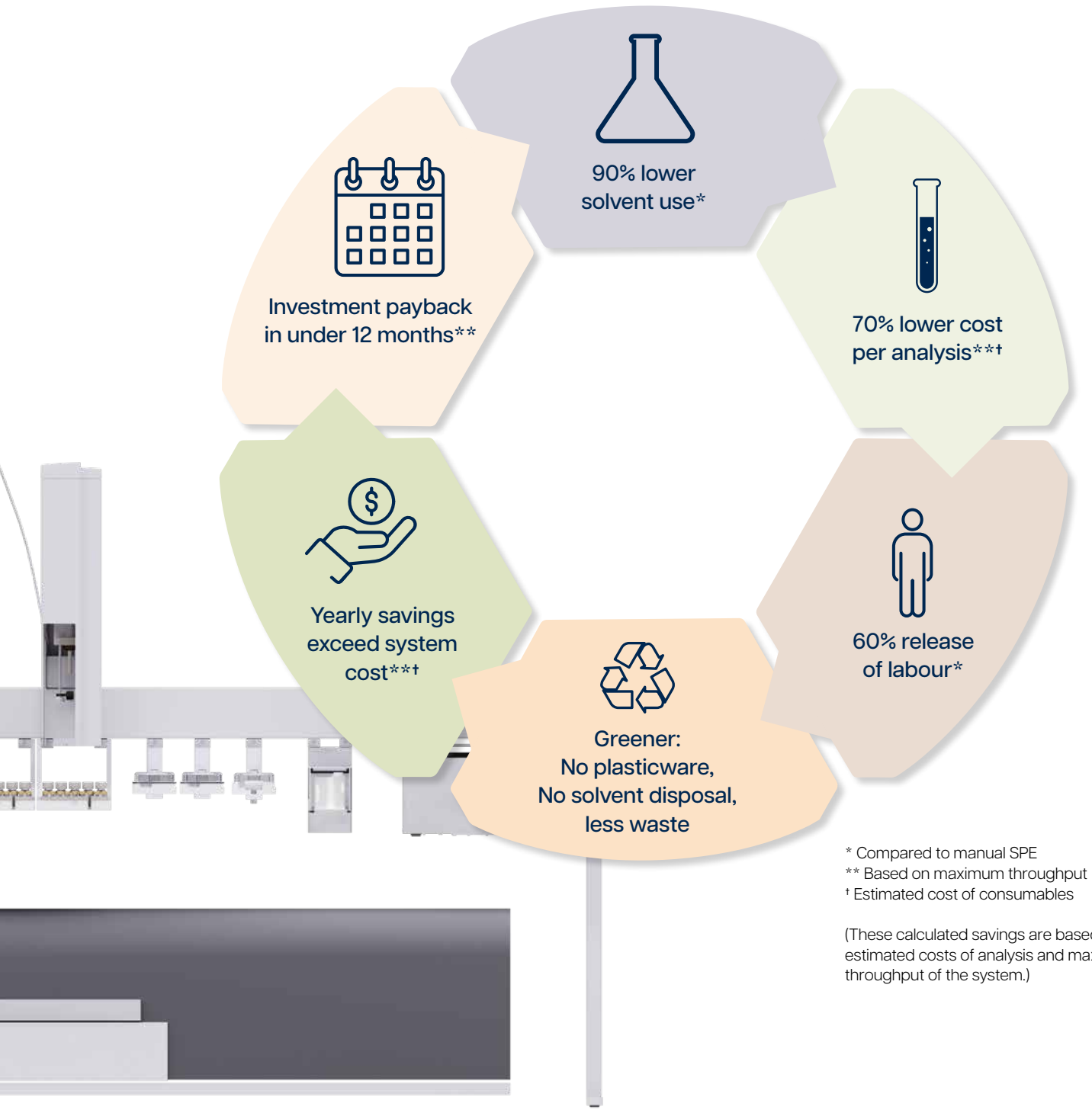
The CHRONECT Workstation PFAS is a comprehensive automated sample preparation solution that seamlessly integrates with your mass spectrometer system—there is no need to replace your MS.

The method employs peak focusing technology to achieve excellent chromatography for all eluted peaks. The proprietary SPE material has been carefully chosen to ensure optimal retention of PFAS analytes. The SPE delivers exceptional recovery for all compounds and surrogates from soil extracts, consistently demonstrating reproducible performance.

Trajan has rigorously tested a range of consumable products compatible with the CHRONECT Workflow PFAS system to prevent potential contamination issues that could hinder troubleshooting efforts. Consumables endorsed by Trajan offer stable, low-background analysis, instilling confidence in the analysis system.

The CHRONECT features a fully automated system that integrates the sample extraction with online SPE directly to the Mass Spec. This efficiency delivers a solution that optimizes the entire process, saving you time and money.

Your return on investment with a CHRONECT system offers great potential. The increased sample throughput delivers an investment return of 100% within 12 months!



* Compared to manual SPE
** Based on maximum throughput
† Estimated cost of consumables

(These calculated savings are based on estimated costs of analysis and maximum throughput of the system.)

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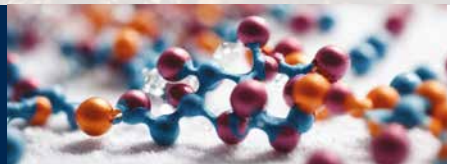
CHRONECT Workstation PFAS

The CHRONECT Workstation PFAS provides analysis using fully automated online SPE coupled with LC-MS.
It allows large-volume injections with higher analyte load and matrix removal. The CHRONECT Workstation PFAS provides a better analytical result with lower solvent use compared to traditional methods.

Visit us at www.trajanscimed.com or contact your regional Trajan representative for more information.



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Trajan Scientific and Medical develops products and services that can enable critical improvement in the analytical workflow. We aim to have positive impact on human well-being with the delivery of precision products that protect sample integrity and minimize result variation.

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