PAL System µSPE

Info and parts

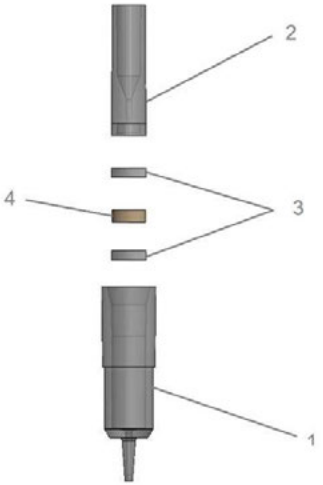
PAL SYSTEM
Ingenious sample handling

PAL System µSPE – New cartridge

Key features of new PAL System µSPE cartridge

The outer part (1) provides a higher capacity and flexible volume for filter disks (3) and the sorbent material (4). The bottom outlet is designed to penetrate pre-slit septa and to deliver directly to LC injection ports. The inner plunger (2) provides critical functionality with the compression of the sorbent/filter layers, and a precise needle guide for safe and upright transport.

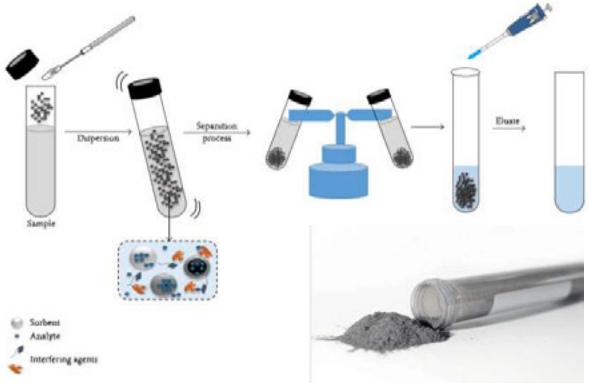
- For all PAL3 RTC Systems
- Novel septum-less cartridge design using CTC patented sealing technology – Gauge 22 flat point style syringes required
- High pressure rating (up to 15bar)
- Sorbent Capacity: 10 to 100 mg packing possible (depending on density)
- Chemically inert materials used and free from leachable
- Designed to penetrate pre-slit septa of vials
- Designed to elute directly into PAL System liquid injection ports
- Quality control steps for each cartridge during manufacturing guarantee highest reproducibility (batch to batch and batch internal variations are minimized).
- *SW: Supported by Chronos 5.5.0 and PAL Method Composer (PMC) 1.5 for FW 4.x*
- *Custom Scripts for QuEChERS workflow for FW 2.x, 3.x and 4.x available*



PAL System µSPE – New cartridge

Benefits of µSPE to dSPE

- Shorter clean-up time compared to dSPE
- Less maintenance and higher productivity due to significantly better clean-up performance compared to dSPE
- Automated clean-up and injection or offline clean-up to serve multiple LCMS and GCMS systems
- Significantly less solvent consumption
- Significantly less time to process generated data
- No evaporation needed to avoid uncontrolled decomposition and loss of analytes
- Precisely controlled loading, washing and elution by adjustable flow rates and volumes
- Automation friendly solutions
- Proven technology and developped with Key Opinion Leaders



PAL System µSPE – New cartridge

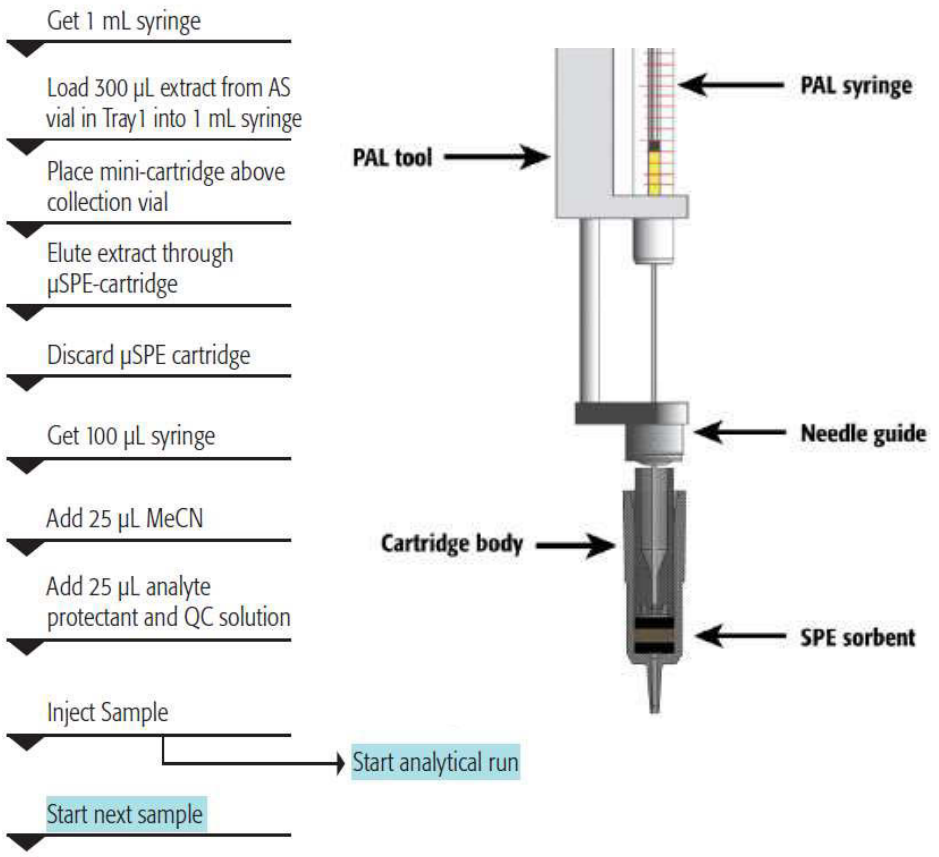
Benefits of the new PAL System µSPE cartridge

- Multiple elution steps possible thanks to septum-less design
- Higher sorbents capacity for broader application ranges
- Higher productivity thanks to shorter cycle times (up to 500 µL/ min flow rates possible)
- Minimized delay volume (20 µL)
- Development kit for customized sorbent materials packing available

Clean-up of QuEChERS extracts with µSPE

For GC-MS and LC-MS analysis

- The µSPE clean-up achieves high quality results for diverse type of analytes and foods (apple, kiwi, carrot, kale, orange, black olive, pork loin, salmon, avocado).
- µSPE provides better cleanup than dispersive-SPE (d-SPE) that is often incorporated in QuEChERS sample preparation.
- The automated µSPE step takes 8 min per sample.



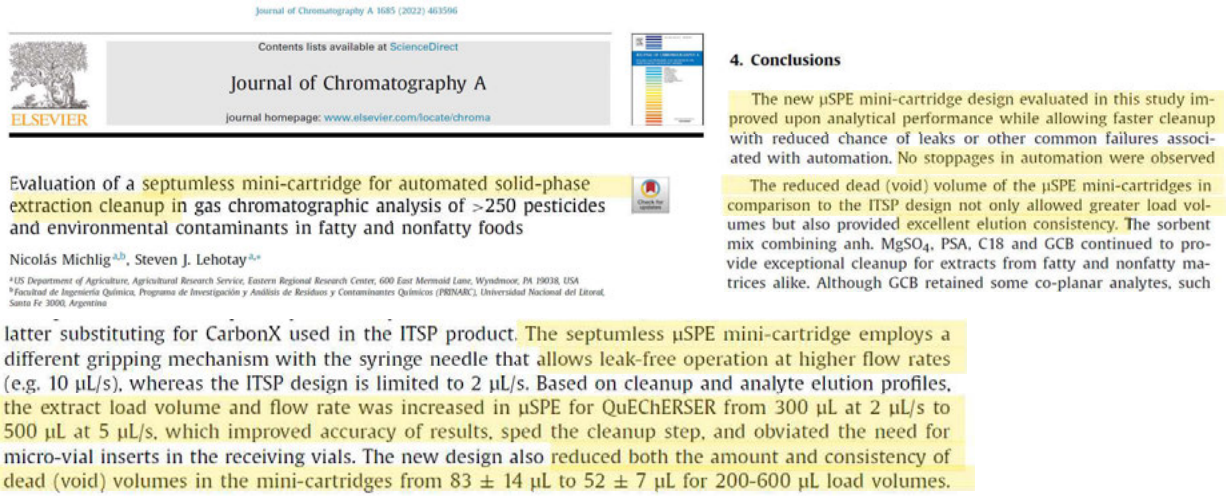
FOOD SAFETY

ENVIRONMENTAL

Clean-up of QuEChERS extracts with µSPE

Publication with new PAL µSPE by Key Opinion Leaders

Steven Lehotay; US Department of Agriculture, 2022



Journal of Chromatography A 1685 (2022) 463596

Contents lists available at ScienceDirect

Journal of Chromatography A

journal homepage: www.elsevier.com/locate/chroma

Evaluation of a septumless mini-cartridge for automated solid-phase extraction cleanup in gas chromatographic analysis of >250 pesticides and environmental contaminants in fatty and nonfatty foods

Nicolás Michlig [a,b], Steven J. Lehotay [a,*]

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[b] Facultad de Ingeniería Química, Programa de Investigación y Análisis de Residuos y Contaminantes Químicos (PRINARC), Universidad Nacional del Litoral, Santa Fe 3000, Argentina

4. Conclusions

The new µSPE mini-cartridge design evaluated in this study improved upon analytical performance while allowing faster cleanup with reduced chance of leaks or other common failures associated with automation. No stoppages in automation were observed

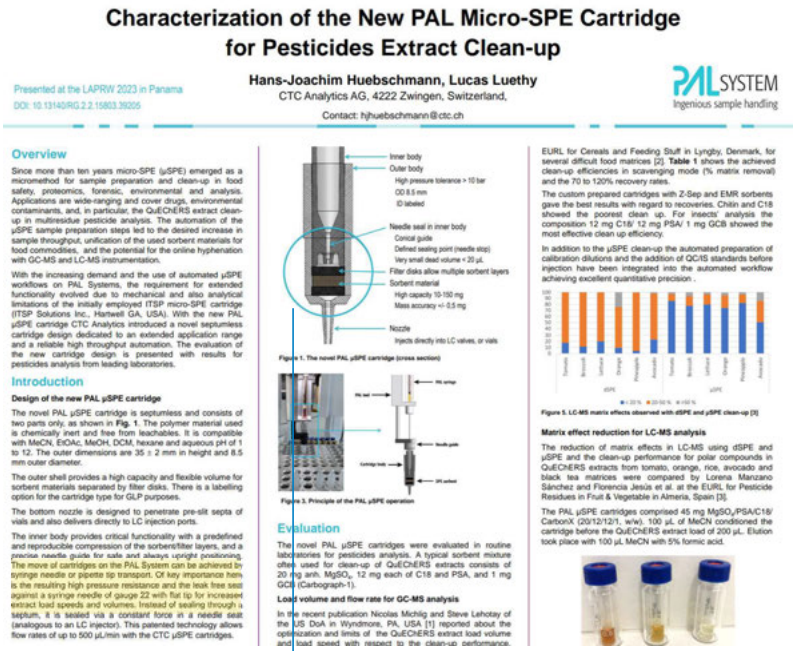
The reduced dead (void) volume of the µSPE mini-cartridges in comparison to the ITSP design not only allowed greater load volumes but also provided excellent elution consistency. The sorbent mix combining anh. $MgSO_4$, PSA, C18 and GCB continued to provide exceptional cleanup for extracts from fatty and nonfatty matrices alike. Although GCB retained some co-planar analytes, such

latter substituting for CarbonX used in the ITSP product. The septumless µSPE mini-cartridge employs a different gripping mechanism with the syringe needle that allows leak-free operation at higher flow rates (e.g. 10 µL/s), whereas the ITSP design is limited to 2 µL/s. Based on cleanup and analyte elution profiles, the extract load volume and flow rate was increased in µSPE for QuEChERSER from 300 µL at 2 µL/s to 500 µL at 5 µL/s, which improved accuracy of results, sped the cleanup step, and obviated the need for micro-vial inserts in the receiving vials. The new design also reduced both the amount and consistency of dead (void) volumes in the mini-cartridges from 83 ± 14 µL to 52 ± 7 µL for 200-600 µL load volumes.

Voice of customer to new µSPE cartridge

Reduced dead volumes
Improved analytical performance
Improved robustness, leak free operation
Improved speed

CTC Analytics Poster @ LAPRW Panama, 2023



Characterization of the New PAL Micro-SPE Cartridge for Pesticides Extract Clean-up

Hans-Joachim Huebschmann, Lucas Luethy
CTC Analytics AG, 4222 Zwingen, Switzerland,
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Presented at the LAPRW 2023 in Panama
DOI: 10.13140/RG.2.2.15803.39205

PAL SYSTEM Ingenious sample handling

Overview

Introduction

Design of the new PAL µSPE cartridge

Evaluation

Load volume and flow rate for GC-MS analysis

Matrix effect reduction for LC-MS analysis

Patented sealing,
Requires Gauge 22, FL needles

Clean-up of QuEChERS extracts with µSPE

Publication with new PAL µSPE by Key Opinion Leaders

Mette Erecius Poulsen; National Food Institute Technical University DK, 2021


Contents lists available at ScienceDirect

Journal of Chromatography A

journal homepage: www.elsevier.com/locate/chroma

Evaluation of the automated micro-solid phase extraction clean-up system for the analysis of pesticide residues in cereals by gas chromatography-Orbitrap mass spectrometry

Elena Hakme*, Mette Erecius Poulsen

National Food Institute, Technical University of Denmark, Søborg, Denmark

4. Conclusion

The main benefit of µ-SPE is the increase in laboratory productivity and sample throughput, with an associated reduction of labor. The best strategy for accurate pesticide determination and quantitation is the use of semi-procedural matrix calibration. The automated µ-SPE system could be used as a standalone system, or it could be coupled to a high-sensitivity analytical instrument. In the latter case, the addition of some features, such as a thermo-

Amadeo Fernandez-Alba; European Union Reference Lab – University of Almeria, 2023


Contents lists available at ScienceDirect

Journal of Chromatography A

journal homepage: www.elsevier.com/locate/chroma

Evaluation of automated clean-up for large scope pesticide multiresidue analysis by liquid chromatography coupled to mass spectrometry

Lorena Manzano Sánchez, Florencia Jesús, Carmen Ferrer, M. Mar Gómez-Ramos, Amadeo Fernández-Alba*

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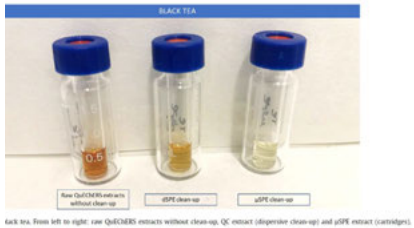
In general, the µSPE method provides recoveries that are very similar to those obtained with manual clean-up because the extraction step is the same for both approaches. Of great interfective at avoiding inconvenient trapping processes. In conclusion, automatic µSPE avoids the qualitative and quantitative errors that are produced when dSPE is applied.



4. Conclusions

The use of automated µSPE clean-up reduces the laboratory workflow and allows increased sample throughput in routine analysis by 30%. Moreover, as only a single clean-up is employed equally for all commodities, a simplify multiresidue method is obtained with the important benefits with method application. Very high homogeneity is typically obtained in the calibration curves avoiding typical quantitation errors. Instrument maintenance is

Agilent Technologies, ASMS Poster, 2022

Voice of customer to new µSPE

Increase productivity – shorter cleanup time
Robustness – consistent data,
Robustness - reduced qualitative and quantitative errors
Flexible (standalone or in line)
One method for all, simplify multiresidue methods
Full automation

PAL System µSPE – New cartridge

QuEChERS Cleanup Workflow

µSPE Prep → µSPE Elute → Sample Injection

QuEChERS follows the scavenging mode: Matrix is retained, and analytes eluted.

Movie PAL uSPE QuEChERSCleanup

µSPE has two typical modes of operation.
1. Enrichment mode or
2. Scavenging mode

PAL System µSPE – New cartridge

Portfolio and Applications

CTC part number	Description	Image
µSPE cartridges for pesticide analysis / QuEChERS		
uSPE-GCQuE1-45-V	PAL System uSPE Cartridge - GC QuEChERS sorbent mix 1 - 45mg **C18 EC (12 mg), PSA (12 mg), $MgSO_4$ (20mg), GCB (1mg)** 108 pcs type 01-05B Requires 4.x or higher*	 NEW!
uSPE-GCQuE2-44-V	PAL System uSPE Cartridge - GC QuEChERS sorbent mix 2 - 44mg **C18 EC (12 mg), PSA (12 mg), $MgSO_4$ (20mg)** 108 pcs type 01-19A Requires 4.x or higher*	 NEW!
uSPE-GCQuE3-45-V	PAL System µSPE Cartridge -GC QuEChERS sorbent mix 3 – 45mg **PSA (6.43mg), $MgSO_4$ (38.57 mg)** 108 pcs type 01-14A Requires FW 4.x or higher*	 NEW!

* Scripts for FW 3.x or 2.x available on request

PAL System µSPE – New cartridge

Portfolio and Applications

CTC part number	Description	Image
µSPE cartridges for pesticide analysis / QuEChERS		
uSPE-LC-QuE1-30-T	PAL System µSPE Cartridge -LC QuEChERS sorbent mix – **C18 EC (21 mg), Z-Sep (8 mg), GCB (1mg)** 30mg 96 pcs in blister type 01-03A Requires FW 4.x or higher*	 NEW!
µSPE cartridges for custom loads – Development Kit		
uSPE-Dev-Kit-100	PAL System uSPE Cartridge - Development Kit - without resin 100 pcs type 01-09 Requires 4.x or higher *	 NEW!

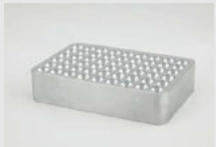
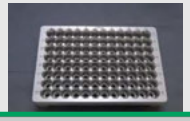
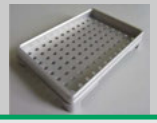
* Scripts for FW 3.x or 2.x available on request

PAL System µSPE – New cartridge

Accessories for µSPE

CTC part number	Description	Image
µSPE hardware kits		
PAL3-HW-uSPE54	PAL3 Kit for PAL System uSPE cartridges with smart syringes. 1 pc uSPE Liquid Tool D8/57 with Needle Guide for µSPE cartridges 2 pc Liquid smart syringe 1000µL (SF1000-57-T-22-FL), gauge 22, flat tip 1 pc Trayholder 2 pc VT54 rack (PAL3-Rack-VT54) 1 pc uSPE Cartridge Tray, 54 position, aluminum 1 pc uSPE Elution Tray Cover, 54 position aluminum 1 pc Waste Receptacle with drain 4 pc PAL System uSPE cartridges for initial installation, 3-point teaching USB stick with installation guide and scripts (FW 2.x, 3.x and 4.x)	
µSPE Cartridge Kits & Vials		
Vial-1.5ND-CG-100	PAL System Vial 2CV, 1.5ml Clear Glass with Label, designed for the PAL Autosampler. 12x32mm, 1st Class Hydrolytic Glass, fits ND9 Screw Caps, Pk of 100 Pcs	
Vial-0.3ND9-PP-100	PAL System Micro-Vial 2CV, 0.3mL Clear PP, designed for the PAL Autosampler. 12x32mm, with conical insert, fits ND9 Screw Caps, Pk of 100 Pcs	
Cap-ND9-ST-SP10Sb-100	PAL System Screw Cap 2CV, designed for the PAL Autosampler. ND9, Magnetic, Gold, Silicone/PTFE/Starburst-Slitted Septa 1.0mm, Pk of 100 pcs	
Cap-ND9-PP-SP10S-100	PAL System Screw Cap 2CV, designed for the PAL Autosampler. ND9, Silicone/PTFE/I-Slitted Septa 1.0mm, Pk of 100 pcs	

PAL System µSPE – New cartridge

CTC part number	Description	Image
µSPE Accessories: Racks and holders		
PAL3-Vial-Lock-uSPE54	µSPE Elution Tray Cover to lock 2 mL Vials in place, matching VT54 Rack For use with uSPE Cartridges	
PAL3-Wasterecept-uSPE	µSPE Waste Receptacle to hold uSPE Cartridge Tray 54 or 96 positions Includes waste adapter for mounting on bottom of tray holder	
PAL3-Rack-Cart-uSPE54	Cartridge Tray to hold 54 µSPE cartridges - also used for optional cartridge conditioning	
PAL3-Rack-Cart-uSPE96-B	Cartridge Tray to hold 96 µSPE cartridges in blister	
PAL3-Rack-Cart-uSPE96	Cartridge Tray to hold 96 µSPE cartridges	

NEW!

PAL3-Rack-Cart-uSPE96-9 uSPE Cartridge Tray, 96 Positions, 9mm


PAL SYSTEM
Ingenious sample handling