

CLEANUP

with Agilent EnviroPrep GPC columns

The Measure of Confidence



Solutions for the cleanup of food and environmental samples

Food Safety and Environmental Monitoring

Governments and international bodies increasingly require the analysis of food and environmental samples for a wide range of contaminants, such as pesticides, herbicides, and fungicides. In addition, changes in legislation have kept pace with advancements in analytical methods. Trace level detection is now routine, and can be specified in regulations that seek to reduce the risk of pollutants entering the food chain.

However, the analysis of pesticides and priority pollutants from complex food and environmental samples by GC, GC/MS, HPLC, or LC/MS is more successful if low volatility, high molecular weight interferences, such as lipids, pigments, proteins, humic acids and plasticizers, are removed first. Failure to remove these interfering compounds can shorten column lifetime and increase analytical downtime.

Benefits of Cleaning Up Samples

- **Easier analysis** - removal of interferences that cause poor analytical results ensures a simple interpretation of the final analysis.
- **Greater confidence** - improved accuracy and linearity of the final analysis by the removal of extraneous samples gives lower detection limits and greater confidence in the results.
- **Reduced maintenance costs** - a clean sample reduces the risk of damage to analytical equipment therefore reduces maintenance costs and downtime.
- **Reduced analysis costs** - analysis of a cleaner sample improves the efficiency of the final analysis, leading to improved analysis quality and reduced analysis cost.

Learn more about Agilent GPC solutions

Visit the GPC web page to download or order printed copies of useful GPC solutions' literature:

- Product guides
- Application compendia
- Primers
- And more...



agilent.com/chem/GPCresources

Agilent EnviroPrep gives you *unrivalled resolution and peak shape, saves time, and allows for flexibility*

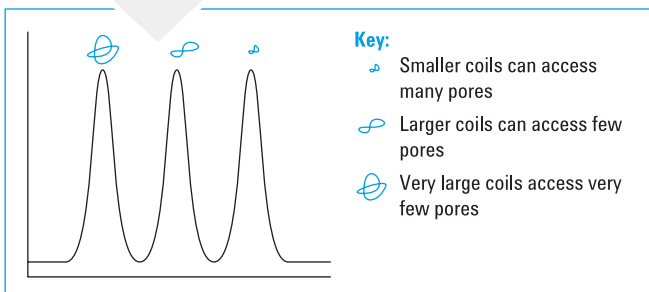
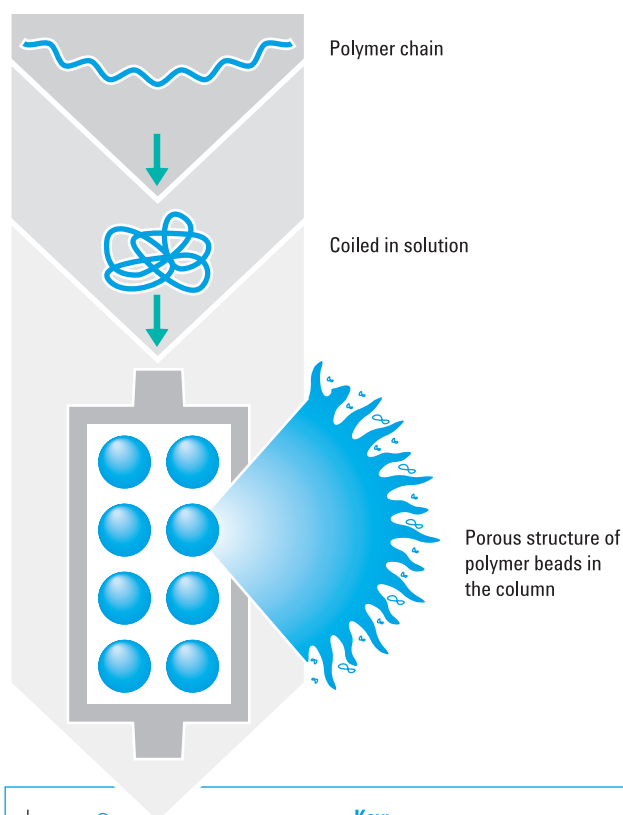


Agilent Technologies

Solution for Sample Cleanup by GPC

Using gel permeation chromatography (GPC), it is easy to isolate pesticides and priority pollutants from high molecular weight interferences, so that they can be collected for further analysis. High resolution Agilent EnviroPrep columns cleanup complex biological matrixes, such as plant or animal tissue. EnviroPrep complies with guidelines in EP methods 3640A, DFG 519, EN1528, and those of other regulatory bodies involved with food and environmental control.

GPC is an ideal method for the cleanup of samples from environmental and biological sources. GPC uses a size-based separation to separate the species of interest from higher molecular weight matrixes. The size exclusion separation is based on partitioning the components of the sample between a flowing liquid phase and stationary liquid trapped in the pores of a suitable material, typically porous crosslinked polymer beads. The pore size in the beads is carefully controlled such that smaller molecules are able to enter the pores, whereas large molecules have restricted access. Larger molecules therefore elute from the column very quickly whereas smaller molecules are retained and elute later.



EnviroPrep Benefits

Greater confidence

- To allow the separation of trace components at low concentrations, the rigid and well-defined pores of the macroporous packing material give unrivalled resolution and peak shape.

Save time

- For fast start-up times and guaranteed performance, pre-packed EnviroPrep columns have been QC tested to ensure performance straight out of the box.
- For sample cleanup in minimal time with maximum throughput, highly mechanically stable EnviroPrep columns can be operated up to 2200 psi (150 bar) with eluent flows up to 10 mL/min.

Flexibility

- EnviroPrep columns can be used with any liquid chromatography system capable of isocratic flow at the required flow rates.

EPA Test Separation

EPA 3640A has defines a cleanup method for the removal of lipids and other high molecular weight interferences from a sample containing pesticides or other species of interest. The method suggests a separation of a test solution is suggested to determine the performance of the separation. The GPC calibration solution is prepared in dichloromethane containing the analytes in the key below.

The criterion for the test separation is that each of the peaks can be resolved in the sample. With EnviroPrep, sharp peaks are obtained with clear separation, illustrating the use of the column for applications covered by the EPA method (Figure 1).

Conditions

Column: 2 x EnviroPrep, 25 x 300 mm (p/n PL1210-6120EPA)

Eluent: Dichloromethane

Flow rate: 10 mL/min

Detector: UV, 254 nm

Key

Compound	Approx. sample concentration (mg/mL)
1. Corn oil	25,000
2. Bis(2-ethylhexyl) phthalate	1,000
3. Methoxychlor	200
4. Perylene	20
5. Sulfur	80

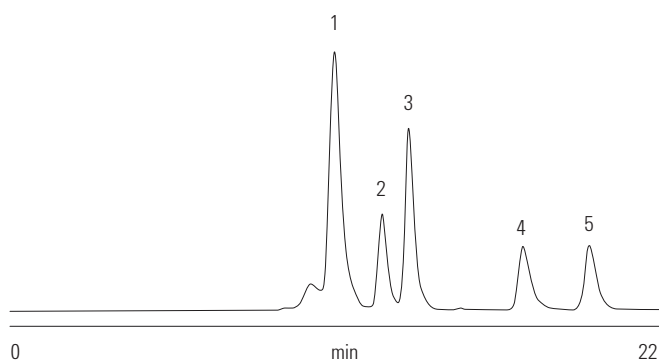


Figure 1. EPA 3640A test separation using Agilent EnviroPrep.

Analysis of Pesticides in Mackerel

As part of a food safety program, the level of the pesticide 1,2,3,4,5,6- $C_6H_6Cl_6$ in a sample of seafood was evaluated. A sample of mackerel was macerated and the tissue was extracted into chloroform. The resulting organic solution was then cleaned up by elution through two EnviroPrep 25 x 300 mm columns connected in series.

Figure 2 clearly shows that EnviroPrep columns can be used to separate high molecular weight lipids that are excluded on the columns from a small molecule pesticide. This allowed collection of the pure pesticide in solvent for further analysis and demonstrated the use of EnviroPrep for cleaning up a complex sample.

Conditions

Pesticide: 1,2,3,4,5,6- $C_6H_6Cl_6$

Column: 2 x EnviroPrep, 25 x 300 mm (p/n PL1210-6120EPA)

Eluent: Tetrahydrofuran

Flow rate: 10 mL/min

Detector: RI

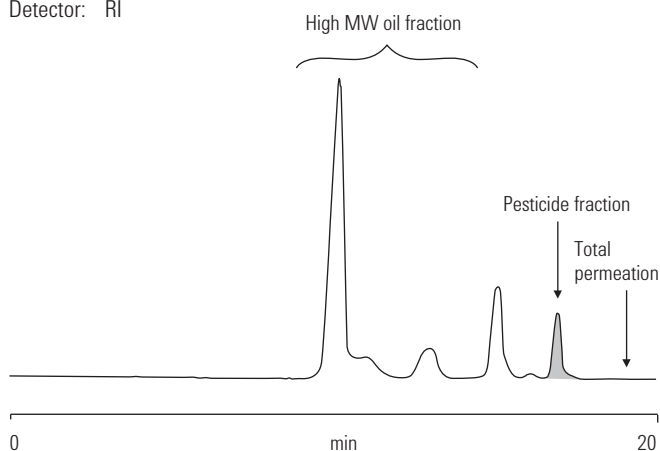


Figure 2. Clean-up of a mackerel sample using two Agilent EnviroPrep columns.

Ordering Information

Description	Part number
EnviroPrep, 25 x 300 mm	PL1210-6120EPA
EnviroPrep, 25 x 150 mm	PL1210-3120EPA
EnviroPrep, 21.2 x 300 mm	PL1E10-6120EPA
EnviroPrep, 21.2 x 150 mm	PL1E10-3120EPA

For use with EnviroPrep columns to extend lifetime:

Description	Part number
PLgel Prep Guard	PL1210-1120

Learn More:

www.agilent.com/chem/EnviroPrep

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- Meet stringent food safety standards and regulations.
- Confidently identify species, confirm geographic origin, identify pathogens, and detect allergens.
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