Rapeseed Oil Pesticides by Gel Permeation Chromatography Using Agilent EnviroPrep

Application Note

Food Testing and Agriculture

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Introduction

Rapeseed oil is a healthy salad and domestic cooking oil with typically just 7% saturated fat content. The oil is also high in linolenic acid, one of the "Omega 3" fatty acids identified as having extensive health benefits.

Harvested rapeseed oil can commonly contain traces of pesticides that were used to treat the growing crops. For food safety purposes, pesticide levels must be closely monitored to remove the danger of any adverse health effects. Gel permeation chromatography (GPC) can be used to separate and isolate individual components of a sample based on size exclusion, and can isolate toxic pesticides from contaminated rapeseed oil.

By scaling up these analytical separations to the preparative GPC scale, it is possible to isolate practical quantities of individual components that can be used in further analysis or compound elucidation.

This Application Note illustrates the use of Agilent EnviroPrep preparative columns in the separation of rapeseed oil from a pesticide. These stainless steel columns are packed with high resolution macroporous material ready for use on any preparative HPLC system.

Verified for Agilent
1260 Infinity
GPC/SEC System

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Method and Results

Initially, the optimum loading of the rapeseed oil sample on the columns was analyzed on an analytical scale using an Agilent PLgel 100Å 10 µm, 300 x 7.5 mm column. The prep-scale conditions were determined from the results obtained on the analytical scale.
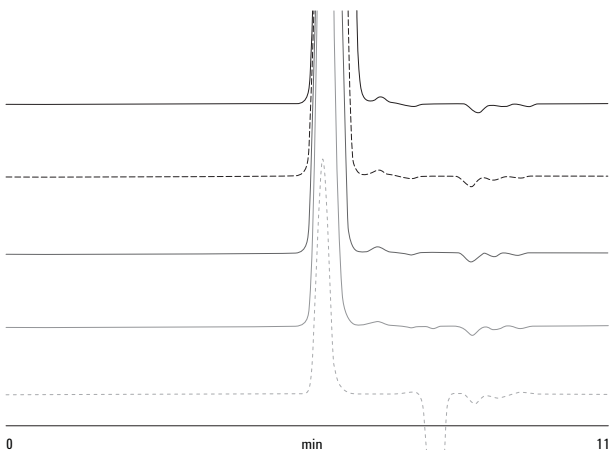

Figure 1. A series of analytical chromatograms of rapeseed oil at concentrations ranging from 1.0% to 7.0% (w/v). The chromatograms show that the oil and additive could be analyzed at a concentration of 7.0% (w/v) without serious loss of resolution.

Conditions - Preparative Scale

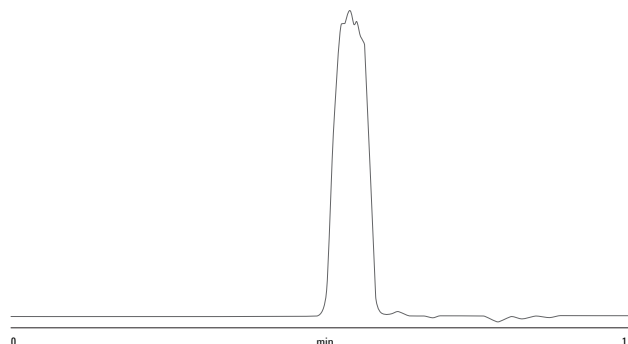|	
Sample	Rapeseed oil, 7.0% (w/v)
Column	EnviroPrep, 300 x 25 mm (p/n PL1210-6120EPA)
Eluent	Dichloromethane
Flow Rate	10.0 mL/min, 0.5 mL/min to the detector
Inj Vol	2 mL
Detector	RI

Figure 2. A preparative GPC-scale chromatogram at a concentration of 7.0% (w/v).

Conditions - Analytical Scale

Sample	Rapeseed oil, 7.0% (w/v)
Column	PLgel 10 µm 100Å, 300 x 7.5 mm (p/n PL1110-6120)
Eluent	Dichloromethane
Flow Rate	1.0 mL/min, 1.0 mL/min to the detector
Inj Vol	200 µL
Detector	RI

Conclusions

Gel permeation chromatography, refractive index detection and EnviroPrep columns is a simple system for the high resolution separation of pesticides in food samples. In this instance, a simple loading study established the prep-scale conditions for a successful isolation of a pesticide in a sample of rapeseed oil.

EnviroPrep columns are packed with high resolution macroporous material ready for use on any preparative high pressure liquid chromatography system. Macroporous materials are highly crosslinked with a rigid and permanent pore structure which ensures high resolution separations, particularly where high sample loading is not required.

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