Alkyl Glycerides from Frying Fat on Agilent PLgel 3 µm with Gel Permeation Chromatography

Application Note

Materials Testing and Research, Polymers

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Introduction

Alkyl glycerides are discrete molecules commonly found in frying fats and oils. Agilent's PLgel 3 µm 100Å columns for gel permeation chromatography have been specifically designed for the analysis of low molecular weight molecules from complex mixtures such as these. In this example, the columns are used for the analysis of alkyl glycerides, and for resolving individual molecules from complex alkyl glyceride mixtures such as occur in frying fats.

Analysis of Alkyl Glycerides

The samples were made up at 0.2% (w/v) in tetrahydrofuran and injected without further treatment. Figure 1 shows two overlaid chromatograms of lauryl and stearyl mono-, di-, and triglycerides, illustrating the base line resolution possible with these high efficiency columns.

Figure 2 shows the separation of a complex mixture of alkyl glycerides. Although base line resolution is not possible with two columns, the two-column set has resolved the individual components from the mixture, allowing identification of the molecules to be made after appropriate calibration.

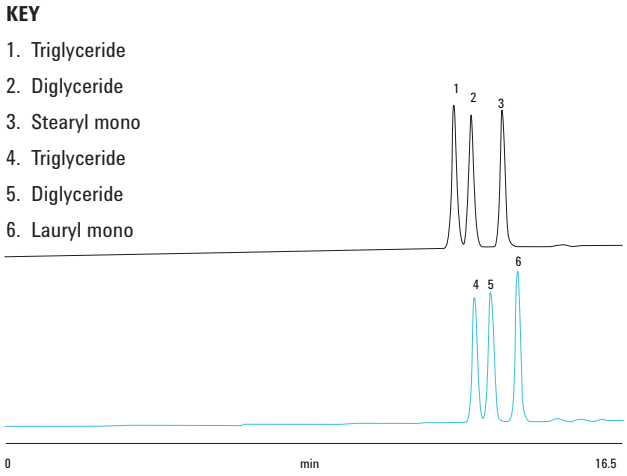

Figure 1. Overlaid chromatograms of lauryl and stearyl mono-, di-, and triglycerides, showing the base line resolution possible with high efficiency Agilent PLgel 3 µm columns.

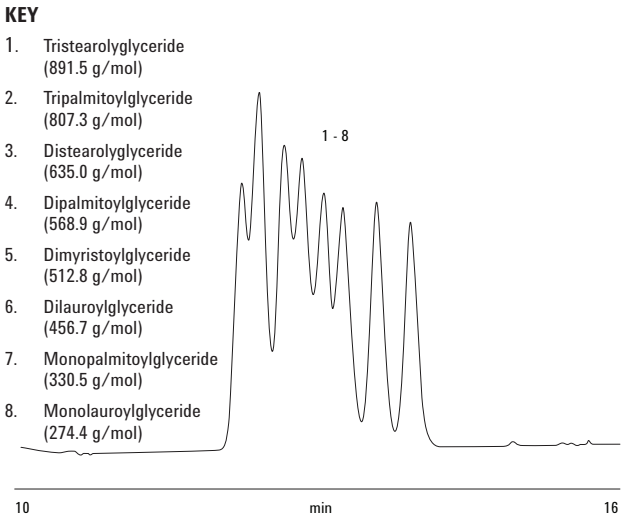

Figure 2. An Agilent PLgel 3 µm two-column set resolves individual components from an alkyl glyceride mixture.

Conditions

Samples	Alkyl glycerides
Columns	2 × Agilent PLgel 3 µm 100Å, 300 × 7.5 mm (p/n PL1110-6320)
Concentration	0.2% (w/v)
Eluent	THF
Flow rate	1.0 mL/min
Injection volume	20 µL
Detector	RI
System	Agilent PL-GPC 50

Further resolution could be obtained by adding additional columns, according to the equation:

$$Rsp = \frac{0.25}{\sigma D}$$

where Rsp is the specific resolution, σ is the peak variance (related to the peak width) and D is the slope of the calibration curve. Increasing the number of columns in the analysis reduces the slope of the calibration curve.

Conclusions

A sample of frying fat containing a complex mixture of alkyl glycerides was successfully separated using Agilent PLgel 3 µm 100Å columns to allow for further analysis and identification of the individual components. These low pore size columns are ideal for high resolution separations by gel permeation chromatography of low molecular weight compounds such as alkyl glycerides.

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