Analysis of Petroleum Jelly using Conventional GPC

Application Note

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Introduction

Petroleum jelly is a colorless, translucent gel, usually without taste or smell, that is commonly found as an ingredient in skin care products and cosmetics. It is a purified mixture of semi-solid, saturated hydrocarbons, similar to paraffin in nature and obtained from petroleum. Petroleum jelly has been used for over a hundred years, having first been marketed in 1870 when Richard Chesebrough discovered that by distilling the lighter, thinner oil products from unrefined rod wax he could create the useful gel. Since then many brands, grades and varieties have been created. Analysis of these low molecular weight materials can easily be achieved by gel permeation chromatography (GPC) with high efficiency Agilent PLgel 5 µm MIXED-D columns.

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Conditions

Sample:	Petroleum jelly A and B
Columns:	2 x PLgel 5 µm MIXED-D, 300 x 7.5 mm (p/n PL1110-6504)
Inj Vol:	100 µL
Eluent:	THF
Flow Rate:	1 mL/min
Detector:	DRI

Results and Discussion

Two varieties of Petroleum jelly were analyzed from different manufacturers to obtain an indication of any differences in molecular weight. The samples were made up at 0.2% (w/v) in tetrahydrofuran and injected without further treatment. Figure 1 shows the chromatogram given by Petroleum jelly brand A and Figure 2 shows the chromatogram for brand B.

The two chromatograms are overlaid in Figure 3 to show the subtle differences in molecular weight distribution between the two varieties.

The samples both contain a small amount of high molecular weight material, which can be seen in the molecular weight distribution (Figure 4).

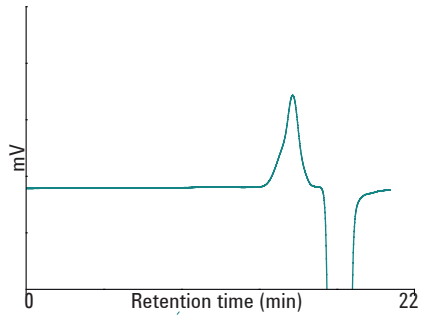

Figure 1. Chromatogram of Petroleum jelly brand A

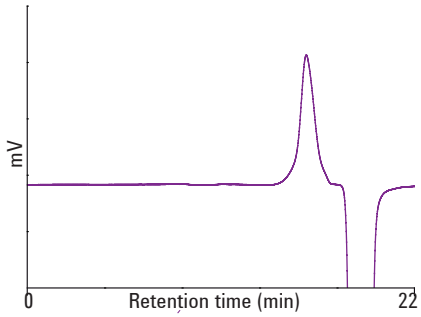

Figure 2. Chromatogram of Petroleum jelly brand B

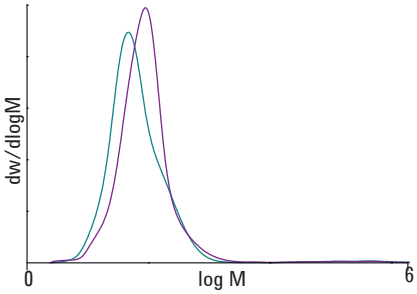

Figure 3. Overlaid chromatograms of two Petroleum jellies reveal slight differences in molecular weight distribution

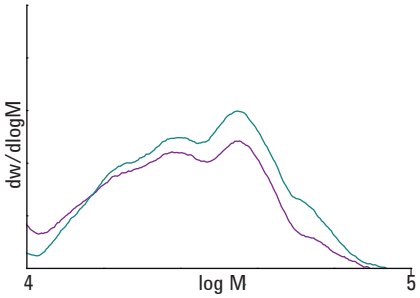

Figure 4. High molecular weight components of two different Petroleum jellies

Conclusion

A two column set of PLgel MIXED-D columns revealed slight differences in the molecular weight distribution of two commercial brands of petroleum jelly.

PLgel 5µm MIXED-D columns are specifically designed for the analysis of polymers, paints and resin systems where material above 400,000 MW is unlikely to be present. High pore volume, concentrated in this operating range, combined with the 5 µm efficiency, provides excellent resolution for low MW polymers and oligomers. Two, or even three, PLgel 5 µm MIXED-D columns are the perfect replacement for the popular 10E4/500Å or 10E4/10E3/500Å/100Å column combinations.

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