

SEC Analysis of Pectin

Application Note

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Introduction

Pectin is a natural product used extensively as a jellifying, thickening and stabilizing agent in the food industry. It is produced from plant raw materials such as apple, citrus and beet. The extracts are processed to derive pectins with specific properties. Although pectin chemical composition is key to its application, rheological behavior is critical to performance, and determination of the molecular weight distribution can help to predict rheological behavior. SEC and Agilent PL aquagel-OH MIXED-H 8 μm columns are ideal for resolving pectins. With their wide molecular weight resolving range (up to 10 million g/mol relative to PEO/PEG) and high efficiency (>35,000 plates/meter), PL aquagel-OH are the columns of choice for this application.



Conditions

Pectin samples were prepared at 2 mg/mL, left to fully dissolve overnight and filtered through a 0.45 μm membrane. The column set was calibrated with narrow pullulan standards and, therefore, all molecular weight values quoted are relative to these. The calibration curve is shown in Figure 1.

Samples: Pectin
 Columns: 2 x PL aquagel-OH MIXED-H 8 μm , 300 x 7.5 mm
 (part number PL1149-6800)
 Eluent: 0.2 M NaNO_3 + 0.01 M NaH_2PO_4 at pH 7
 Flow Rate: 1.0 mL/min
 Detection: RI

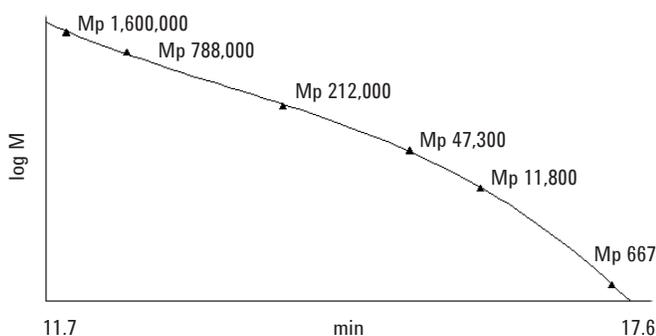


Figure 1. Pullulan standard calibration curve for PL aquagel-OH MIXED-H 8 μm

Results and Discussion

Raw data chromatograms for the pectin samples are illustrated in Figure 2.

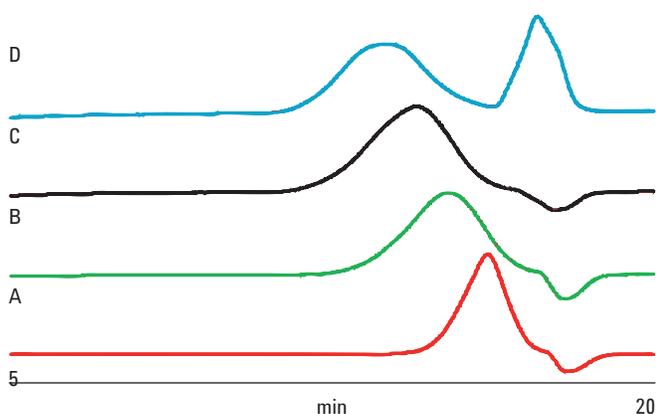


Figure 2. Chromatograms of four pectin samples

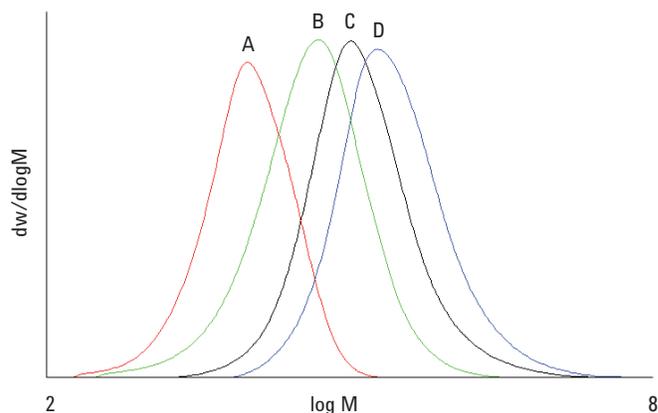


Figure 3. Molecular weight distributions of four pectin samples

Unlike the other samples, sample D exhibits a strong, positive peak around total permeation. This sample is a slow setting grade and contains buffer salts added to modify its properties. Molecular weight averages for the samples are given in the table below.

Table 1. Molecular weight averages for the four pectin samples

Sample	Mn	Mw	Mw/Mn
A	6,520	17,560	2.7
B	21,720	88,480	4.1
C	67,980	243,120	3.6
D	128,360	459,990	3.6

Conclusion

The wide molecular weight operating range of PL aquagel-OH MIXED-H 8 μm columns makes them particularly suited to the analysis of water soluble polymers with intermediate to high molecular weight. The use of a simple buffer solution as the eluent for the analysis of pectins reduces interaction between the sample and the columns ensuring that good chromatography is obtained.

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