USP Analysis of Sugar Alcohols on an Agilent Hi-Plex Ca Column – Mobile Phase Effects

Application Note

Pharmaceutical

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Introduction

Sugar alcohols, or polyols, are hydrogenated carbohydrates commonly used to replace sucrose in foods. They are often used with high-intensity artificial sweeteners to counter their low sweetness.

The separation of seven sugar alcohols on an Agilent Hi-Plex Ca column can be altered by introducing acetonitrile into the mobile phase.

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Experimental

Conditions

Column	Agilent Hi-Plex Ca USP L19, 4.0 × 250 mm, 8 µm (p/n PL1570-5810)
Mobile phase	100% DI H_2O (initially)
Flow rate	0.15 mL/min
Injection volume	10 µL
Temperature	90 °C
Detector	RI

Sample Preparation

The seven sugar alcohols — iso-erythritol, adonitol, arabitol, mannitol, xylitol, dulcitol, and sorbitol — are made up to a concentration of 10 mg/mL in water. See Figure 1.

When pure water is used for the mobile phase, several of the sugar alcohols in the sample either partially or completely co-elute. Modifying operating temperature or flow rate is very unlikely to give a good separation between these compounds.

Introducing acetonitrile into the mobile phase has a significant effect on the selectivity of the Agilent Hi-Plex Ca material and results in a doubling of the retention time. As a result, the mobile phase and flow rate conditions need to be modified as follows:

Conditions

Mobile phase	30:70 acetonitrile:100% DI H_2O
Flow rate	0.20 mL/min
Temperature	90 °C

The same quantity of test solution is injected. See Figure 2.

Conclusion

As can be seen by comparing the two chromatograms, using 30% acetonitrile gives extra retention for the sugar alcohols and, as a result, increases the resolution between them. All seven sugar alcohols are now either partially or completely separated. It also gives a change in the elution order.

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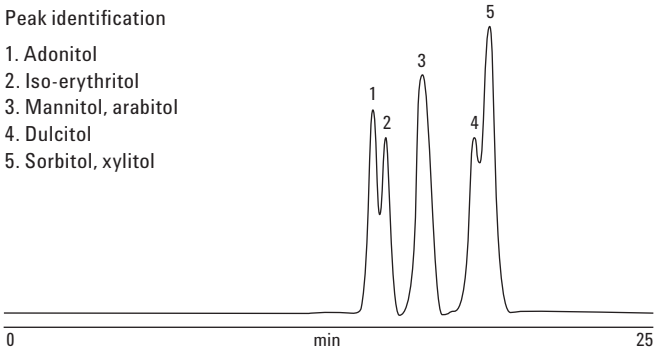

Figure 1. Raw data chromatogram of seven sugar alcohols on an Agilent Hi-Plex Ca USP L19 column.

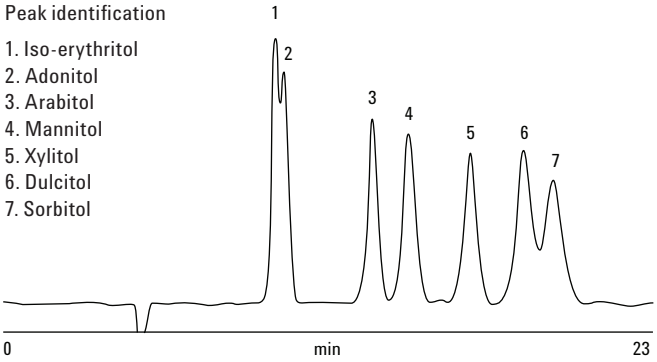

Figure 2. Raw data chromatogram of seven sugar alcohols on an Agilent Hi-Plex Ca USP L19 column after the introduction of acetonitrile into the mobile phase.

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