HPLC of Aloe Juice Using Evaporative Light Scattering Detection

Application Note

Food and Pharmaceutical

Author

Stephen Bullock

Agilent Technologies, Inc.

Introduction

Aloe vera (syn. *Aloe barbadensis* Mill.) has been used as a medicinal plant for some 5,000 years. However, it is only in the last 20 to 30 years that information about this "miracle" plant and its possible healing power has reached a wider public. Aloe vera has been suggested as an ideal moisturizer and healing aid when applied topically on burns, sunburn, and various skin conditions. Many people also drink the juice in expectation of a balanced, healthy lifestyle or as an alternative to non-natural health supplements. In addition, the juice is consumed to aid the healing of specific illnesses or conditions.

Aloe vera juice contains over 200 active ingredients, of which the most prominent are vitamins, amino acids, minerals, phytonutrients, enzymes, and sugars (monosaccharides, disaccharides, and polysaccharides). Studies in the field of glycomics suggest that the monosaccharide content in aloe juice contributes significantly towards its anti-inflammatory activity. Normally, nonchromophoric sugar separations are performed using a refractive index (RI) detector, but RI commonly suffers from the problems of baseline instability and poor sensitivity. The Agilent 385-ELSD (evaporative light scattering detector) is a superior choice for this type of analysis.

Agilent Hi-Plex Ca columns contain a monodisperse sulfonated polystyrene incorporating 8% divinylbenzene with a calcium counter ion, and provide a separation based on a combination of both size exclusion and ligand-exchange chromatography.

To highlight the excellent resolving power of an Agilent 385-ELSD and Hi-Plex Ca system, aloe juice was analyzed, together with glucose and fructose (monosaccharides) and trehalose (disaccharide) standards. These sugars are commonly present in aloe juice.

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Experimental

Instrumentation

Column	Agilent Hi-Plex Ca, 7.7 x 300 mm, 8 µm (p/n PL1170-6810)
Detector	Agilent 385-ELSD (neb = 50 °C, evap = 90 °C, gas = 1.6 SLM)

Materials and Reagents

Mobile phase	100% DI H_2O

Sample Preparation

Glucose, fructose, and trehalose were dissolved in water to 1 mg/mL. Aloe juice was used as received.

Conditions

Soft gel columns should be operated at elevated temperature to reduce operating pressure and permit the use of regular flow rates.

Flow rate	0.6 mL/min
Injection volume	20 µL
Temperature	80 °C

Results and Discussion

Figure 1 illustrates how well the three saccharide standards are resolved. Comparison of the chromatograms of the standards (lower trace) with that of the aloe juice sample (upper trace) confirms that all three saccharides are present in different quantities.

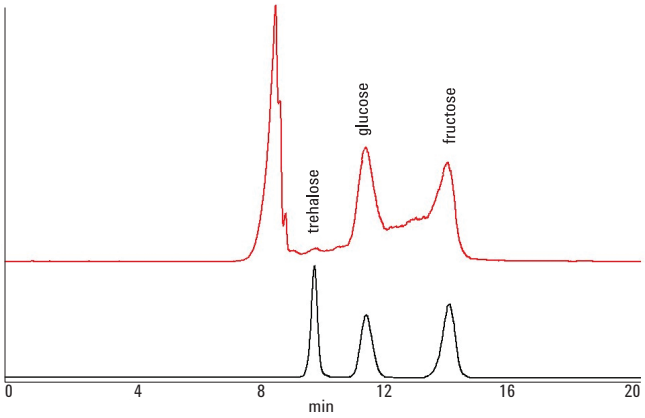

Figure 1. Extremely stable baseline achieved by Agilent Hi-Plex Ca and Agilent 385-ELSD in profiling sugars in aloe vera juice.

Conclusion

An HPLC system comprising the Agilent 385-ELSD and Agilent Hi-Plex Ca column produced good separations and a very stable baseline in the analysis of aloe juice.

Hi-Plex columns are packed with sulfonated resin, giving a fundamental improvement in performance to overcome the problems of low efficiencies and high backpressures encountered with soft gels. The columns are available in calcium form for the analysis of carbohydrates in juices, to meet the growing demand for more detailed product information for labeling and control purposes.

The Agilent 385-ELSD surpasses other ELSDs for low-temperature HPLC applications with semivolatile compounds. Its innovative design represents the next generation of ELSD technology, providing optimum performance across a diverse range of HPLC applications. The unique gas control of the detector permits evaporation of high boiling solvents at very low temperatures. The instrument's novel design provides superior performance for the analysis of semivolatile compounds. Accurate determination of composition and content is assured using the Agilent 385-ELSD and Hi-Plex Ca columns.

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