



Comparison of UV and ELS Detection of Succinic Acid

Polymer Laboratories, Inc., Amherst, Massachusetts

Succinic acid is an organic, dicarboxylic acid widely used in industry as an additive in paints, clothing, and many food products. The use of ELS detection and the PL-ELS 1000 evaporative light scattering detector in its separation from other substances outperforms that of UV and RI detection; it produces no baseline drift and detects no solvent peak.

Succinic acid is an organic acid, which is widely used in industry as an additive in such things as paints, clothing, and many food products. It can be made from the fermentation of glucose and used as a four-carbon block for polymers. Figure 1 shows the chemical structure of succinic acid.

Sample: 1 mg/mL
 Column: PLRP-S, 8 μm , 300 \AA , 150 \times 4.6 mm
 Eluent A: 1% ACN, 0.1% TFA, 99% water
 Eluent B: 100% ACN, 0.1% TFA
 Gradient: 5–80% B in 20 min
 Flow rate: 1.0 mL/min
 Detector: UV, 215 nm
 PL-ELS 1000
 Nebulizer: 85 $^{\circ}\text{C}$
 Evaporator: 85 $^{\circ}\text{C}$
 Gas flow rate: 1.0 SLM

This dicarboxylic acid does not have a good UV chromophore and therefore, the method of detection, if the solute is not to be denatured, is RI. However, the separation of succinic acid from

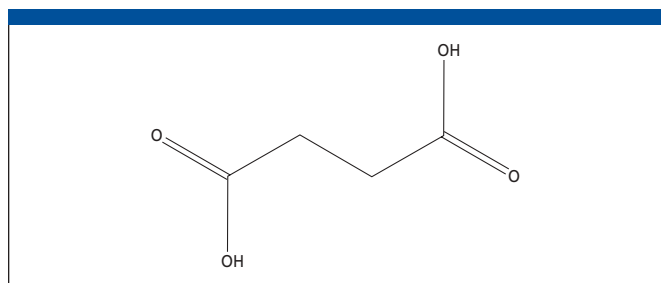


Figure 1: Chemical structure of succinic acid.

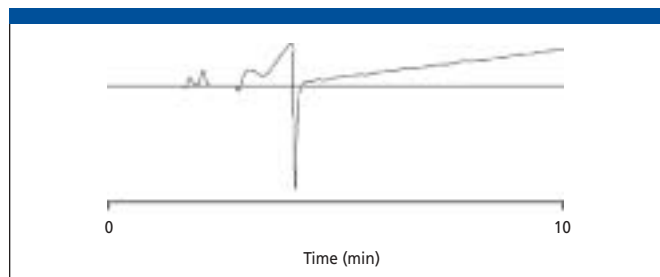


Figure 2: 20 μg succinic acid using UV detection.

other substances requiring gradient elution, such as proteins, rules out the use of RI detection. So, instead, the preferred method of detection is the use of UV at low wavelength; see Figure 2.

This method of UV detection, however, results in a lot of baseline noise and drift with biological samples, which makes the quantification of the additives at low levels extremely difficult. With a protein gradient, the elution time is similar to the solvent peak and it is thus unclear. The use of evaporative light scattering detection allows you to overcome these problems. The baseline is stable, without any drift, and no solvent peak is detected; see Figure 3.

An ELS detector, such as the PL-ELS 1000 detector, gives a much greater response than the UV detector, as succinic acid has a very poor UV chromophore. It is possible to detect succinic acid down to an on-column load of 2 μg , with a 1 mg/mL sample using the PL-ELS 1000; see Figure 4.

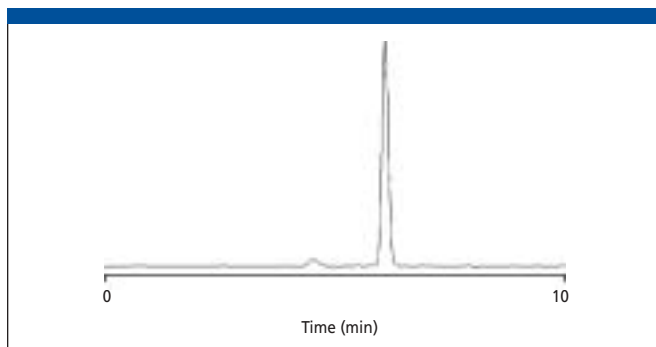


Figure 3: 20 μg succinic acid using ELS detection.

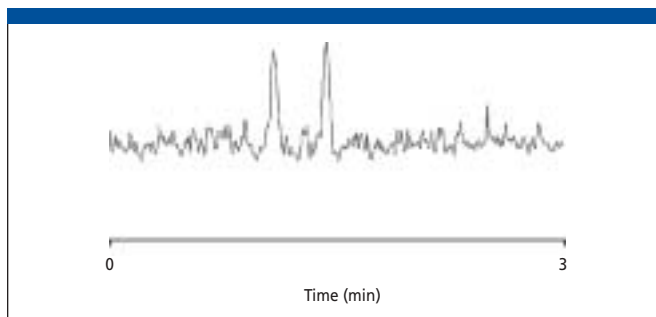


Figure 4: Limits of detection for succinic acid using ELS detection.

Polymer Laboratories, Inc.
 Amherst Fields Research Park, 160 Old Farm Road,
 Amherst, MA 01002
 tel. (413) 253-9554, fax (413) 253-2476
<http://www.polymerlabs.com>