

Artificial Sweeteners -1 Splenda®

The need for universal HPLC detection in analytical laboratories is widespread. While several detection technologies (e.g., low wavelength UV, refractive index, evaporative light scattering, chemiluminescent nitrogen detectors) are currently being used, there is significant room for improvement in performance characteristics such as sensitivity, dynamic range, consistency of response factors and gradient or solvent compatibility.

To help address the many challenges of universal detection, ESA has developed the Corona CAD™ detector. This novel technology offers many benefits to analytical scientists including:

- High Sensitivity - Low ng limits of detection.
- More Consistent Response Factors - Response magnitude does not significantly depend on analyte properties (e.g. molar absorptivity, proton affinity).
- Broad and Useful Dynamic Range - 4 orders of magnitude (ng - µg quantities).
- Excellent Reproducibility - Typically less than 2% RSD.
- Broad Applicability - Can be used with a wide variety of HPLC conditions to measure virtually any nonvolatile analyte including proteins, lipids, carbohydrates and small molecules.
- Ease of Use - Easy setup. Uses minimal bench space and requires only gas input pressure and signal output range to be set.

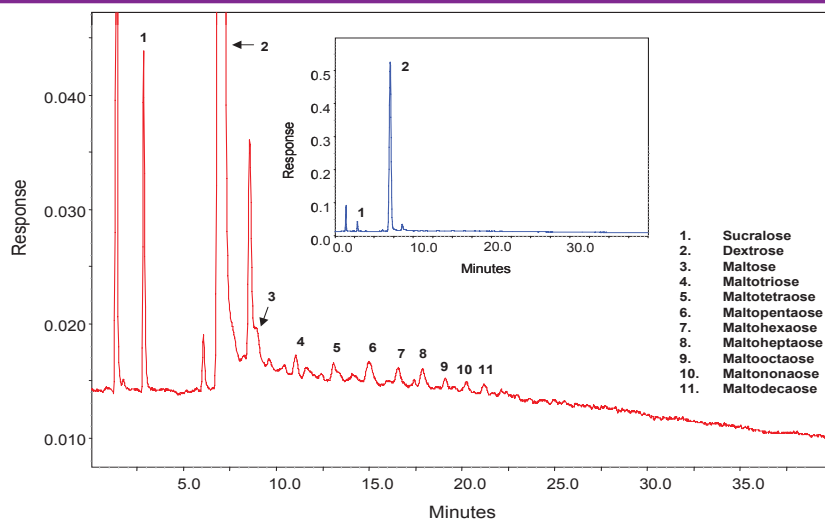


Figure 1. Analysis of Splenda® (10µg on column). Inset is at ~10x less sensitivity.

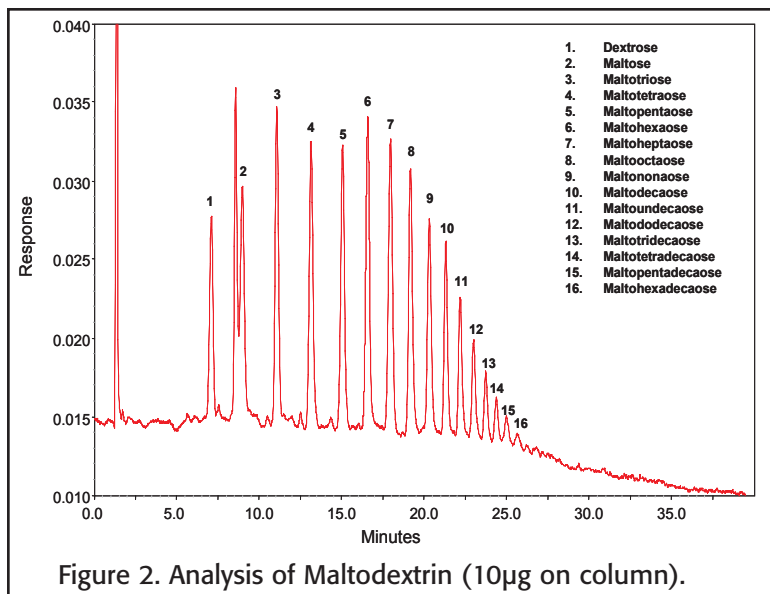
This application note describes the use of the Corona CAD for the measurement of the different ingredients contained in the artificial sweetener, Splenda® (sucralose, dextrose [glucose] and maltodextrin) (Figure 1). Separation of maltodextrin is presented in Figure 2. These are examples of detection of analytes that either lack or possess weak chromophores.

Corona parameters

Gas: 35psi via nitrogen generator
Filter: none
Range: 100pA

HPLC Parameters:
Mobile Phase A: Acetonitrile
Mobile Phase B: Water
Gradient: 30%-70% B in 40 minutes
Flow Rate: 1.0mL/min
Column: Shodex Asahipak NH2P-50 4E
Column Temperature: 35°C
Injection Volume: 10µL

The Corona™ Charged Aerosol Detector



Sample preparation

One packet of Splenda® was dissolved in mobile phase (1mg/mL). Further dilutions were in mobile phase. Maltodextrin standard obtained from Aldrich (4.0-7.0 dextrose equivalent) was dissolved in mobile phase (1mg/mL). Further dilutions were in mobile phase.

Conclusions

The Corona CAD provides universal detection of nonvolatile analytes with response independent of chemical properties, a wide dynamic response range, high sensitivity and good precision. These characteristics, along with reliability and simple operation, make this a superior detector for a wide range of HPLC analyses.

For more information about this application, the Corona CAD, or charged aerosol detection visit www.coronacad.com. We are interested in your opinions and are available to answer any questions you may have: please contact a technical representative at 978.250.7082, or if e-mail is more convenient, send your questions to coronacad@esainc.com.

Ordering information

Description

Corona

Thermal Organizer Module

Nitrogen generator

Pump, model 582

Autosampler, model 542

Elite software including PC

Column, Shodex Asahipak

Part Number

70-6350 (100/120V)

70-6351 (230/240V)

70-5499TA

70-6003

70-4050

70-4152

70-5073



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The Corona CAD is covered by multiple patents