

Phenolic Acids

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.

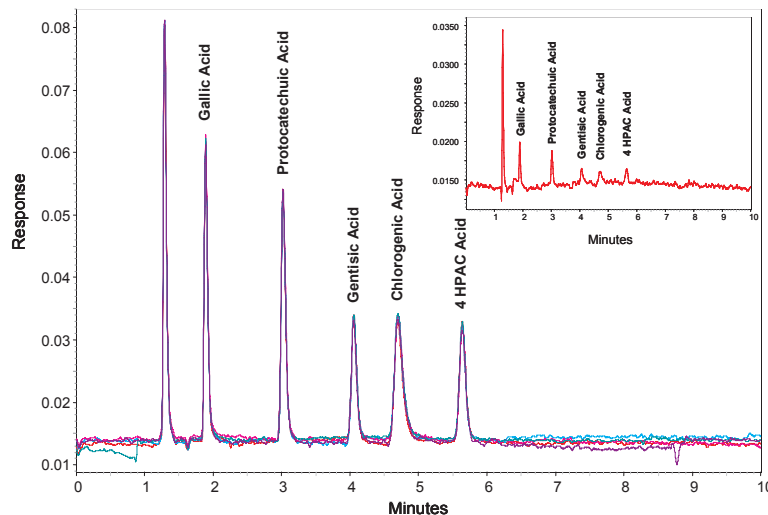


Figure 1. Analysis of Phenolic Acid Standards (200ng each on column, 5 replicates). Inset - 20ng each on column.

This application note describes the use of the Corona CAD for the measurement of several phenolic acids: chlorogenic acid, gallic acid, gentisic acid, protocatechuic acid, and 4-hydroxy phenylacetic acid [4HPAC]. The method had a limit of detection of ~20ng (on column) (Figure 1), showed good precision [%RSD 1.5-3.9 (200ng on column), 1.2-2.0 (2µg on column)] and had a dynamic range from ng to µg levels (Figure 2).

Corona parameters

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

HPLC Parameters:

Mobile Phase: 50mM Ammonium formate (pH 3.0 with formic acid) in 10% Acetonitrile
Flow Rate: 0.6mL/min
Column: MD-150, 3.2 x 150mm; 3µm
Column Temperature: Ambient
Injection Volume: 10µL



The Corona™ Charged Aerosol Detector

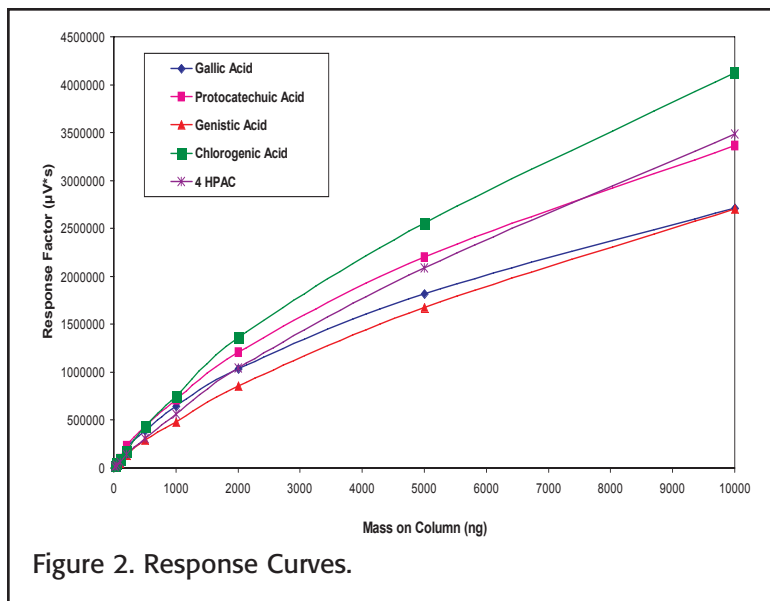


Figure 2. Response Curves.

Sample preparation

Standards were obtained from Sigma (St. Louis, MO). Standards were dissolved in water (5mg/mL). Further dilutions were in water.

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	Part Number
Corona	70-6350 (100/120V) 70-6351 (230/240V)
Thermal Organizer Module	70-5499TA
Nitrogen generator	70-6003
Pump, model 582	70-4050
Autosampler, model 542	70-4152
Elite software including PC	70-5073
MD-150 Analytical	70-0636



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