

# Unsaturated Fatty Acids: Arachidonic, Linoleic, Linolenic and Oleic 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.

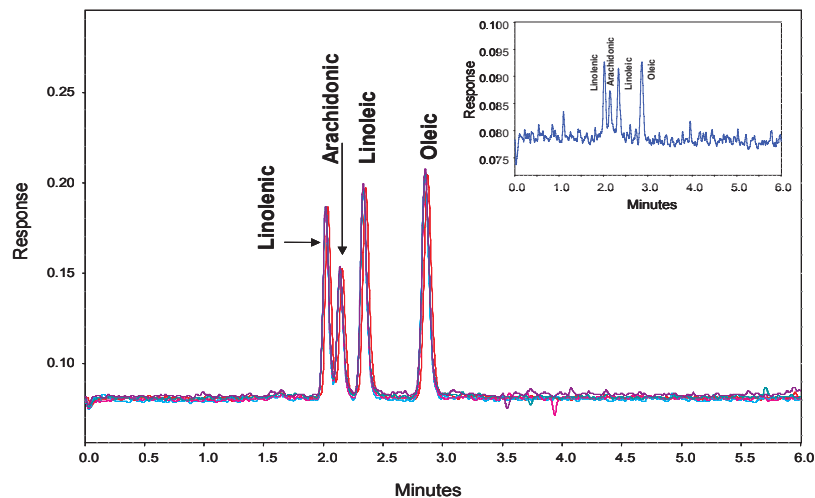


Figure 1. Analysis of Unsaturated Fatty Acids (200ng on column; five replicate injections). Inset - 20ng (on column).

This application note describes the use of the Corona CAD for the measurement of arachidonic (cis, cis, cis, cis, 5,8,11,14 eicosatetraenoic), linoleic (cis, cis, cis, 9, 12, 15 octadecatrienoic), linolenic (cis, cis, 9,12 octadecadienoic) and oleic (cis 9-octadecenoic) acids. The method has excellent sensitivity (<10ng on column) and precision (RSD% <1.7% at 200ng on column) (Figure 1), and a dynamic range that covers ng to µg levels (Figure 2). This is an example of detection of analytes that possess weak chromophore.

## Corona parameters

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

HPLC Parameters:  
Mobile Phase: 75:25; acetonitrile:methanol with 50mM formic acid  
Flow Rate: 0.6mL/min  
Column: MD150, 3.2 x 150mm; 3µm  
Column Temperature: ambient  
Injection Volume: 10µL

# The Corona™ Charged Aerosol Detector

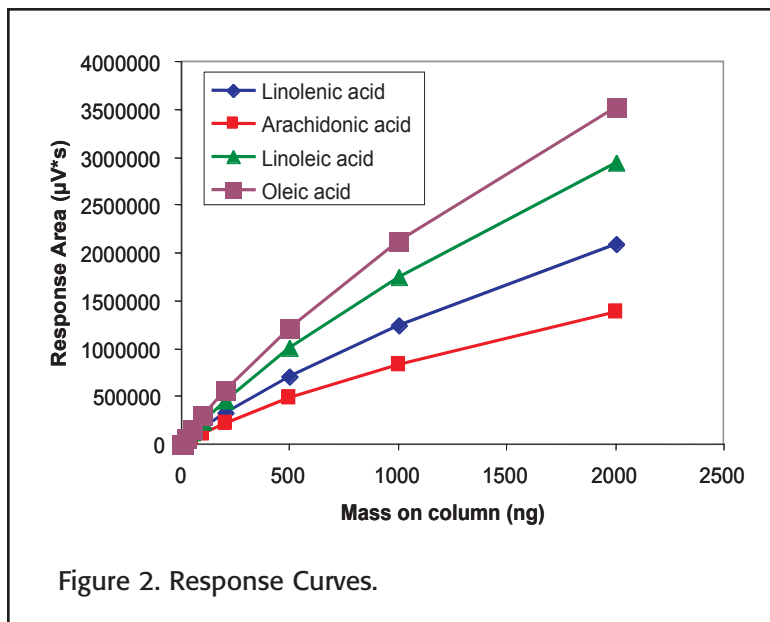


Figure 2. Response Curves.

## Sample preparation

Stock solution were diluted 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](http://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](mailto:coronacad@esainc.com).

## Ordering information

### Description

Corona

Thermal Organizer Module

Nitrogen generator

Pump, model 582

Autosampler, model 542

Quaternary low pressure gradient  
and degasser

Elite software including PC

Column, MD150

### Part Number

70-6350 (100/120V)

70-6351 (230/240V)

70-5499TA

70-6003

70-4050

70-4152

70-5260

70-5073

70-0636



ESA Biosciences Inc. • 22 Alpha Road  
Chelmsford, MA 01824-4171  
U.S.A.

Tel: (978) 250-7000

Fax: (978) 250-7090

[www.esainc.com](http://www.esainc.com)

[www.coronacad.com](http://www.coronacad.com)

ESA Analytical • Brook Farm  
Dorton, Aylesbury  
Buckinghamshire  
HP18 9NH  
England

Tel: 44 (0)1844 239381

[www.esainc.com](http://www.esainc.com)

ESA, Inc. is an ISO 9001 and 13485 Certified Company

Corona™ and CAD™ are trademarks of ESA, Inc.

ESA® is a registered trademark of ESA, Inc.

The Corona CAD is covered by multiple patents