

## Acclaim<sup>®</sup> Organic Acid (OA) HPLC Column



The Acclaim Organic Acid (OA) columns are reversed-phase bonded-silica columns, use-tested for the separation of hydrophilic aliphatic and aromatic organic acids at low pH with UV detection. The Acclaim OA uses a patented polar-embedded stationary phase that allows a broad range of operating conditions, including 100% aqueous mobile phases.

- Use-tested to guarantee consistent organic acid separations
- Compatible with 100% aqueous mobile phases, optimum for reversed-phase retention of hydrophilic aliphatic organic acids

- Hydrolytic stability at low-pH conditions, optimum for reversed-phase retention of organic acids
- Ideal selectivity for separating a wide spectrum of organic acids, including hydrophilic aliphatic acids, C1 to C7 aliphatic acids, aromatic acids, and selected amino acids
- Suitable for analysis of foods, beverages, pharmaceuticals, chemical intermediates, and environmental samples
- Ideal for quality assurance offering fast run times and minimal sample preparation

### Guaranteed Organic Acid Separations

The Acclaim OA column line features a patented polar-embedded stationary phase optimized and use-tested for hydrophilic organic acid separations. The Acclaim OA stationary phase is compatible with 100% aqueous mobile phases and has excellent hydrolytic stability at low pHs and ideal selectivity for separating a wide spectrum of organic acids.

Acclaim OA column performance is guaranteed. Acclaim OA columns undergo extensive testing to ensure column-to-column reproducibility, and are shipped with certificates of analysis detailing these tests.

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## Consistent Performance with 100% Aqueous Mobile Phases

Due to their solubility properties, many polar-organic acids are better retained and resolved on reversed-phase HPLC columns using 100% aqueous mobile phases. The typical phases used in reversed-phase chromatography are very hydrophobic, and the functional groups tend to self-associate when using these 100% aqueous conditions. This self-association leads to reversible reduced retention of analytes. The Acclaim OA columns eliminate this variable retention by incorporating a polar-functional group into the silane linkage, near the surface of the silica particle. This polar group allows water to penetrate and hydrate the silica surface, preventing self-association of the carbon chains. This patented bonding technology allows the hydrocarbon chains to remain extended, even with 100% aqueous mobile phases.

Figure 1 illustrates the ability of the Acclaim OA column to maintain consistent retention and efficiency with 100% aqueous mobile phases under stop-flow conditions. The use of stop-flow conditions illuminates the ability of a bonded phase to maintain performance with 100% aqueous mobile phases. With stop-flow testing, when the pressure to the column is eliminated, the stationary phase tends to expel the polar mobile phase and self-associate or dewet. This phenomenon is illustrated by comparing the performance of the Acclaim OA with a conventional reversed-phase C18 column. The unique polar-embedded chemistry of the Acclaim OA column resists dewetting and the associated irreproducible chromatographic results.

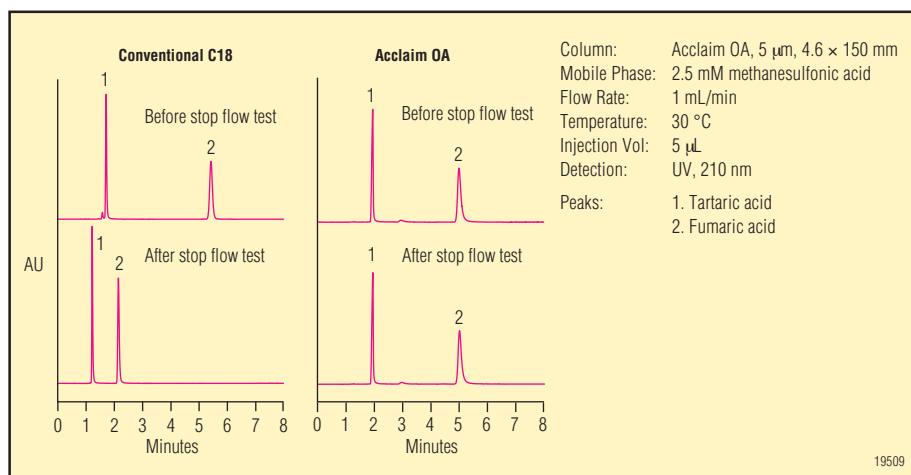


Figure 1. Comparison of a conventional C18 and the Acclaim OA to susceptibility to dewetting in 100% aqueous conditions. The Acclaim OA maintains consistent retention of organic acids while the conventional C18 phase exhibits a significant decrease in retention.

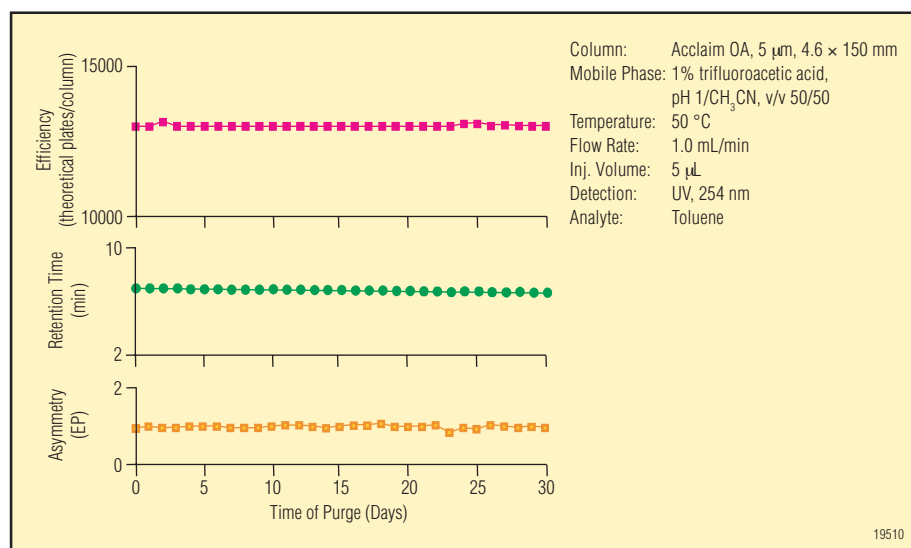


Figure 2. The Acclaim OA column has hydrolytic stability at low pH conditions of pH 1. Peak retention, asymmetry, and efficiency are stable even after 30 days of operation at these extreme conditions.

## Enhanced pH Stability

Organic acids have enhanced reversed-phase retention when acidic mobile phases are used. Many HPLC columns exhibit decreased column life, under these conditions, due to cleavage of the bonded phase by acidic mobile phases. This hydrolysis by the mobile phase results in frequent column replacement and instrument downtime. The Acclaim OA proprietary bonding

resists hydrolytic attack by protecting the bonded phase at low-pH conditions. Figure 2 illustrates the hydrolytic stability of the Acclaim OA at pH 1. Retention, peak asymmetry, and efficiency are maintained even after prolonged use. Figure 3 shows the durability and reproducibility of the Acclaim OA operated at pH 2.68 to facilitate maximum retention of important hydrophilic aliphatic organic acids.

## Wide Range of Applications

The Acclaim OA is the recommended column for determining small hydrophilic organic acids, C1 to C7 aliphatic acids, as well as hydrophilic aromatic acids. The OA is valuable for the analysis and quality assurance of food and beverage products, pharmaceutical preparations, plating baths for semiconductor manufacturing, manufacturing chemicals, and chemical intermediates.

Key Acclaim OA applications include:

- Aliphatic organic acids in foods
  - Orange juice
  - White wine
  - Sports drinks
  - Fresh lemon juice
  - Juice drink blends
- Organic acids in drug preparations
- C1-C7 aliphatic organic acids
- Acrylic acid and its oligomers
- Hydroxybenzoic acids
- Hydroxyphenylacetic acids
- Arylacetic acids
- Benzenepolycarboxylic acids
- Selected amino acids

## Flexible Methods Development

Because the Acclaim OA can be operated at low pH with 100% aqueous buffers, as well as with organic solvents, many mobile phase options are available to optimize your organic acid separations. Modifying the pH of the mobile phase, as illustrated in Figure 4, allows resolution and retention control.

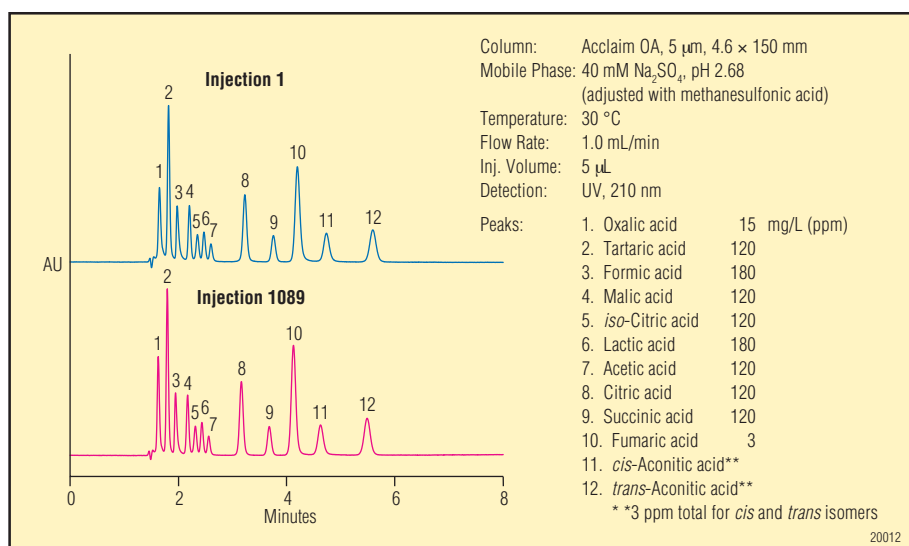


Figure 3. The Acclaim OA maintains resolution and retention of hydrophilic organic acids after long-term operation using 100% aqueous acidic mobile phase conditions.

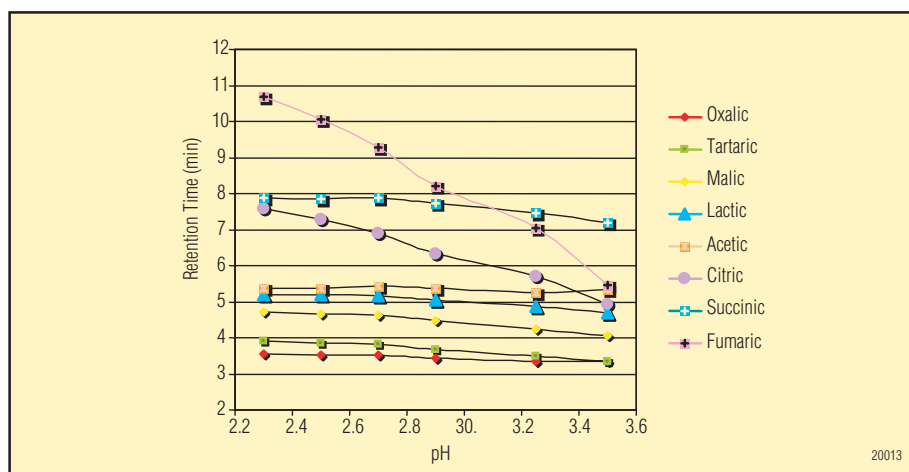


Figure 4. Retention and resolution of hydrophilic aliphatic organic acids can be optimized by mobile phase pH. For aliphatic organic acid profiling, a 40–100 mM buffer at pH of 2.65 is optimal.

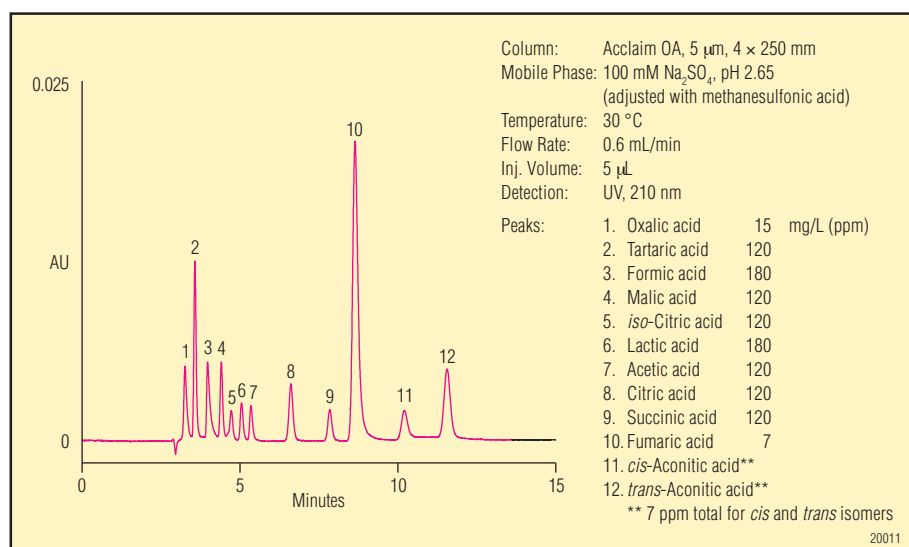


Figure 5. The Acclaim OA is use-tested to guarantee separation of hydrophilic organic acids. These operating conditions provide a good starting point for methods development.

Very polar organic acids have excellent retention in 100% aqueous buffers, as illustrated in Figures 5 and 6. With the addition of a HPLC solvent such as acetonitrile, highly retained aliphatic and aromatic organic acids can easily be eluted with excellent peak shapes. See Figures 7, 8, 9, and 10.

### Ideal for Quality Assurance

If you use traditional reversed-phase HPLC with UV-Visible detection for uncharged molecules plus organic acids, the Acclaim OA columns will give you unparalleled performance. Reversed-phase chromatography allows direct injection without sample preparation other than simple dilution of the product or reaction solution. Samples containing anionic surfactants or anionic dyes cannot be analyzed using anion exchange with conductivity detection but are readily determined using the Acclaim OA with UV detection.

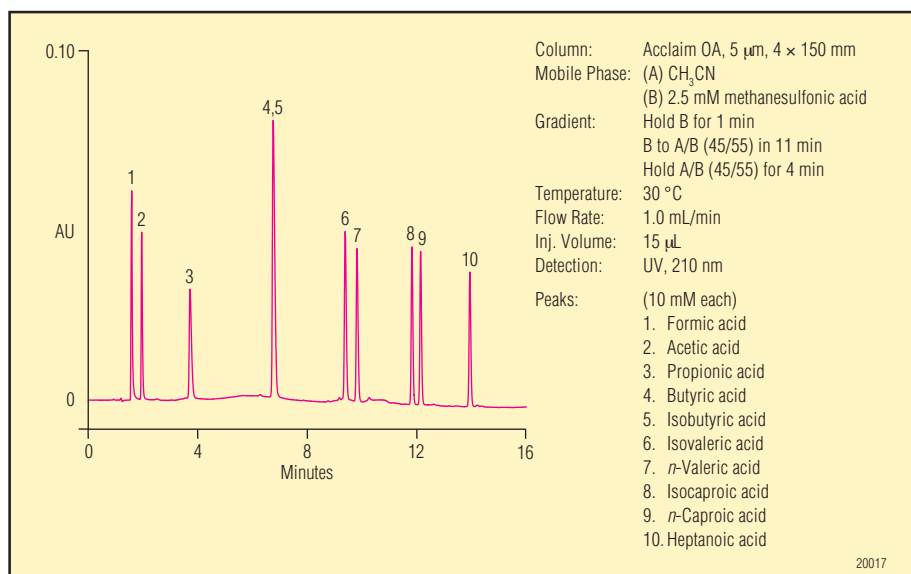


Figure 6. The Acclaim OA column can easily retain and separate C1 to C7 volatile aliphatic acids using an aqueous low-pH mobile phase coupled with an acetonitrile gradient to elute the higher-molecular-weight organic acids.

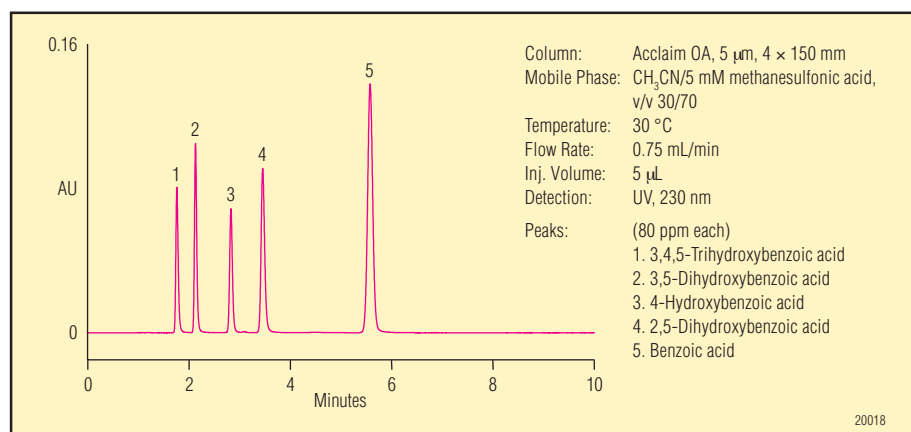


Figure 7. Separation of hydroxybenzoic acids on the Acclaim OA with an acetonitrile mobile phase at low pH.

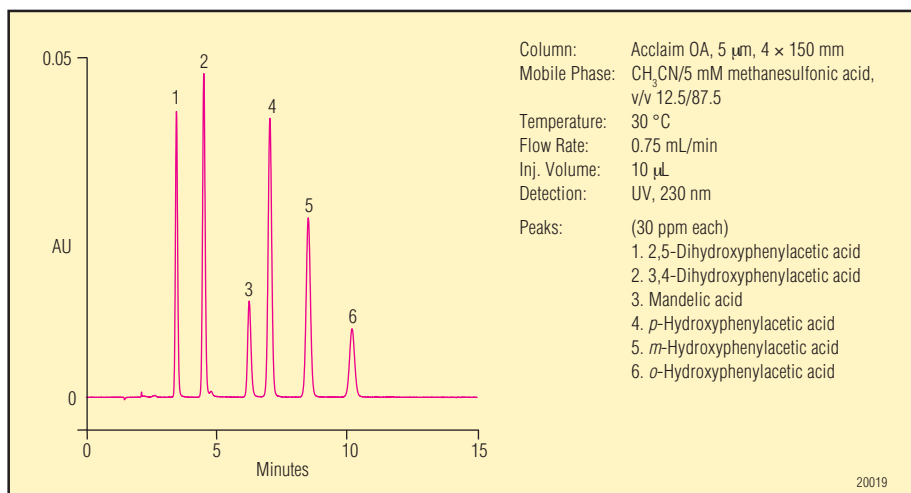


Figure 8. Separation of closely related hydroxyphenylacetic acids on the Acclaim OA with an acetonitrile mobile phase at low pH.

The sensitivity for the Acclaim OA methods is in the low-mg/L (ppm) range. For organic acid determinations requiring trace-level ( $\mu\text{g/L}$ ) sensitivity, consider Dionex anion-exchange with conductivity detection, IC-MS or LC-MS.

### Quality Assurance for Foods and Beverages

Figures 11, 12, 13, and 14 show the analysis of a range of foods and beverages for organic acids. Figure 15 shows that amino acids can be retained and separated. This separation can be useful for analysis of organic acids and selected amino acids in samples such as beers and wine. For many beverage samples, sample preparation was simple with a 2 $\times$  dilution and matrix removal using an OnGuard P (polyvinylpyrrolidone resin) for removal of aromatic compounds in the matrix.

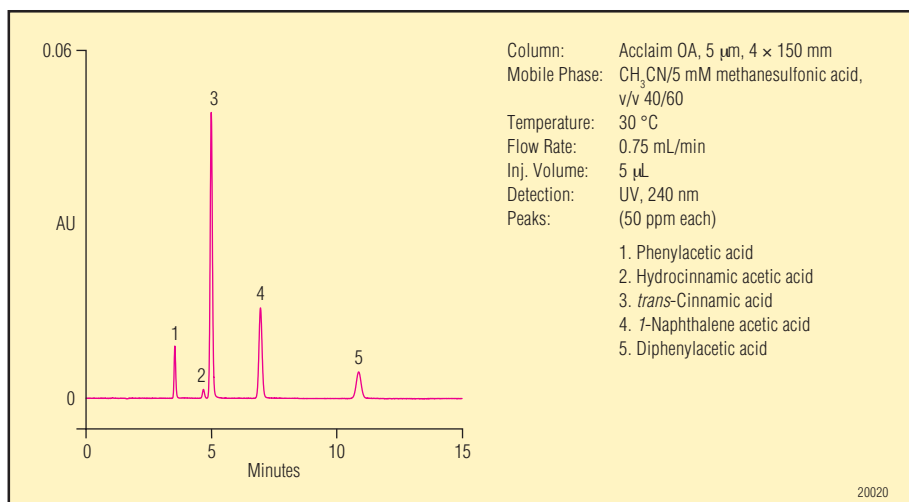


Figure 9. Separation of arylacetic acids on the Acclaim OA with an acetonitrile mobile phase at low pH.

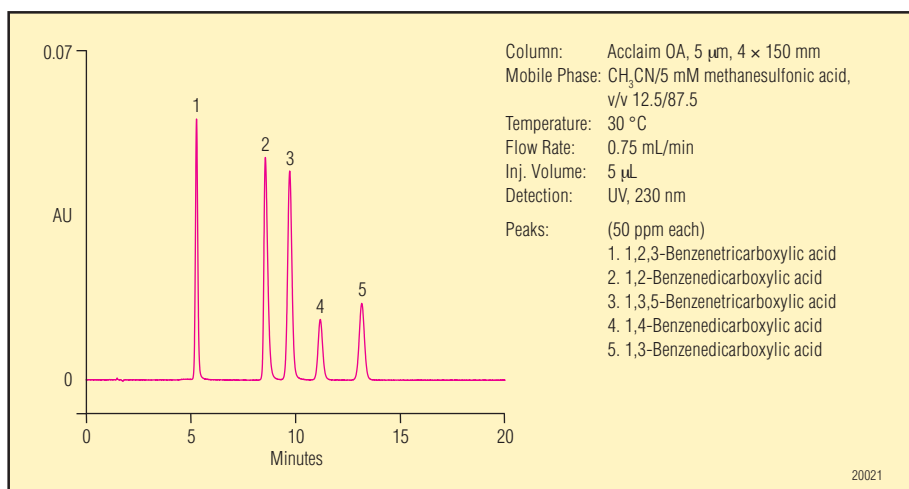


Figure 10. Separation of benzenepolycarboxylic acids on the Acclaim OA with an acetonitrile mobile phase at low pH.

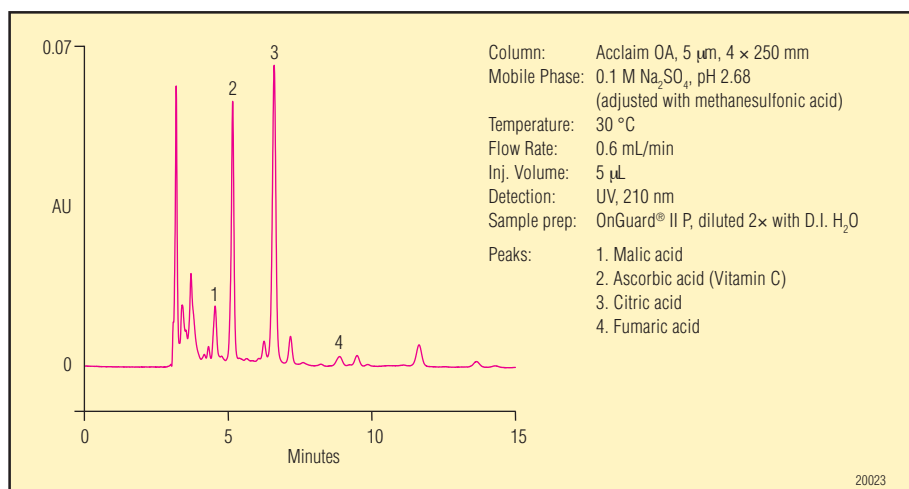


Figure 11. Analysis of orange juice for organic acids on the Acclaim OA.

### Quality Assurance for Pharmaceuticals

Pharmaceuticals may require the determination of the organic acid counter ions or preservatives in the drug formulations. Figure 16 illustrates the determination of the counter ions in an over-the-counter cough syrup using a 100% aqueous buffer on the Acclaim OA column.

### Quality Assurance and Monitoring of Chemicals, Chemical Reaction Mixtures, and Chemical Intermediates

The Acclaim OA column has the flexibility to be used for the determination of organic acids in environmental samples, manufacturing chemicals, and chemical process samples. Figure 17 illustrates the use of the Acclaim OA for the characterization of acrylic acid and its oligomers using an acetonitrile gradient at acidic pH.

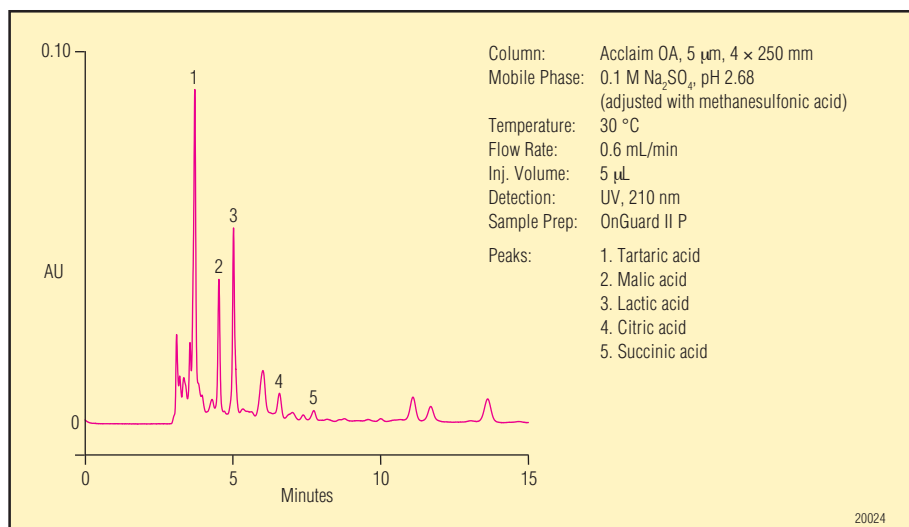


Figure 12. Analysis of white wine for organic acids on the Acclaim OA.

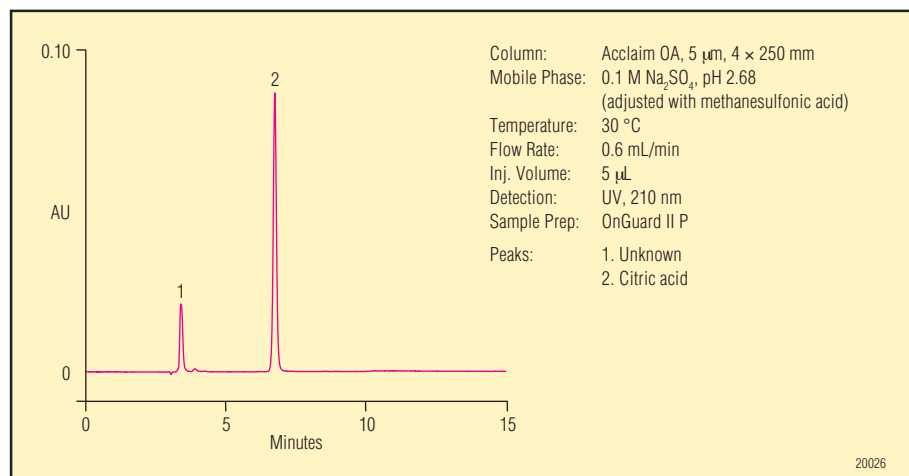


Figure 13. Analysis of Gatorade® sports drink for organic acids on the Acclaim OA.

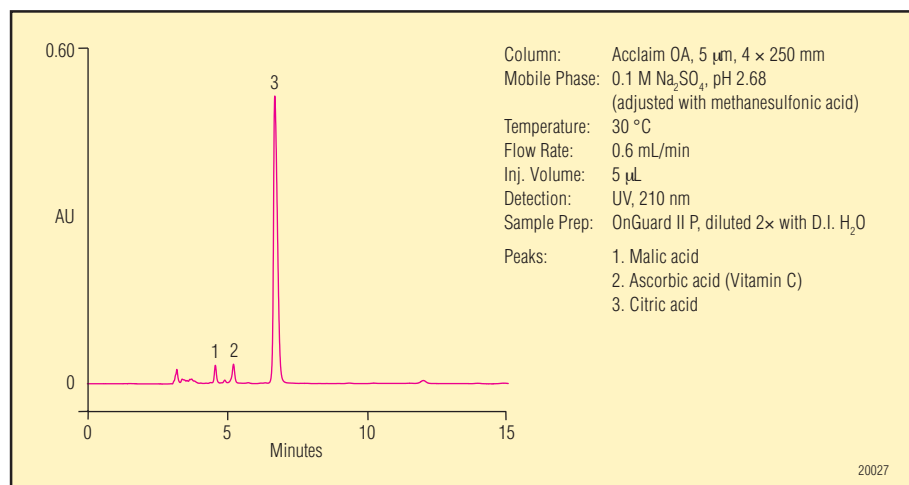


Figure 14. Analysis of fresh lemon juice for organic acids on the Acclaim OA.

## Manufacturing Reproducibility

Each Acclaim OA column is manufactured to stringent specifications to ensure column-to-column reproducibility. Each column is shipped with a lot validation sheet showing the test results and specifications for the lot of bonded silica packed into the column and an individual test chromatogram validating performance for organic acid selectivity. The lot validation tests include a chromatography-based metals test and organic acids resolution tests. Production columns are individually tested for capacity and efficiency, and closely monitored for metals contamination.

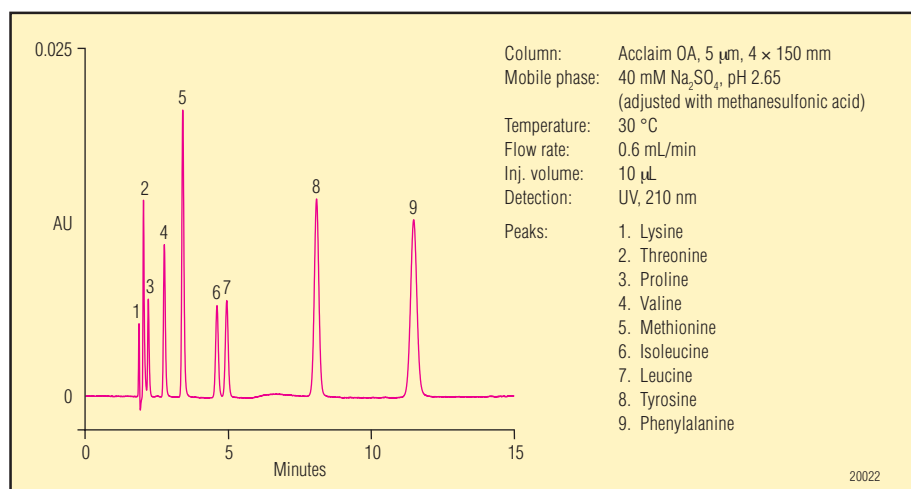


Figure 15. Determination of amino acids on the Acclaim OA using a 40 mM aqueous buffer at pH 2.65 with UV detection.

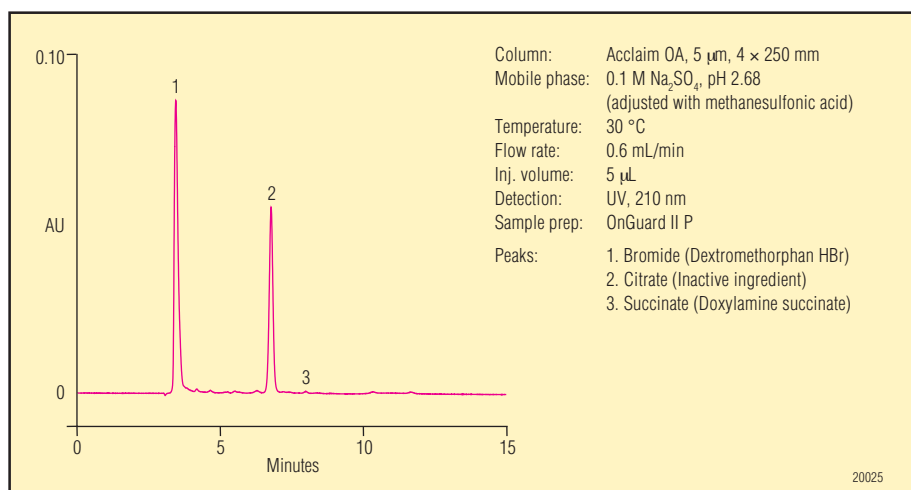


Figure 16. Determination of acidic counter ions in a cough syrup on the Acclaim OA. The inorganic anion, bromide, can also be determined by UV detection in the same chromatographic run.

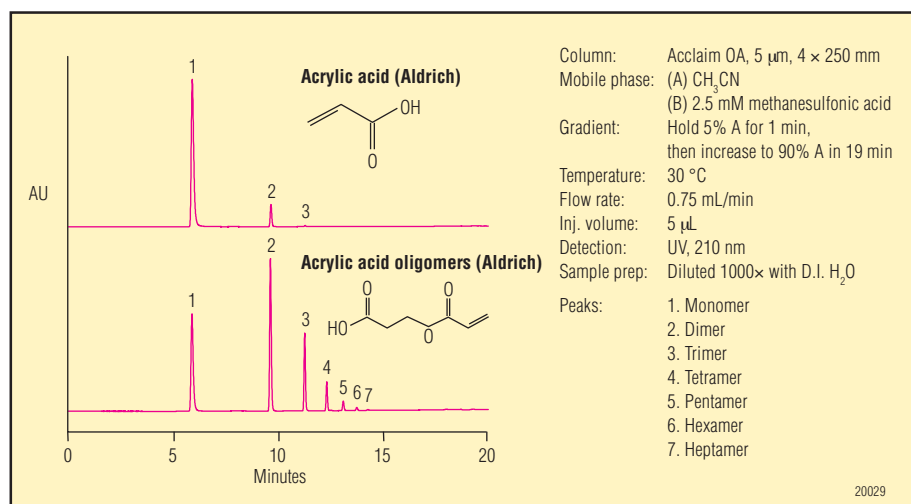


Figure 17. Characterization of acrylic acid and its oligomers on the Acclaim OA.

## ACCLAIM OA SPECIFICATIONS

**Phase:**

Reversed phase with a proprietary polar-embedded group

**Particle Size:**

5 µm

**Pore Size:**

120 Å

**Surface Area:**

300 m<sup>2</sup>/g

**pH Range:**

2–8

**Silica:**

Type B, high-purity, low metal

## ORDERING INFORMATION

Acclaim OA columns are packed in PEEK hardware to minimize potential metal interferences with polyvalent carboxylic acid determinations. Columns are available in 4 × 150 or 4 × 250-mm formats. The guard is a cartridge format packed in a PEEK body with titanium frits. The Acclaim OA can also be purchased as a custom order packed in stainless steel hardware for applications not susceptible to metal interferences. Inquire for custom ordering information.

To order in the U.S., call (800) 346-6390 or contact the Dionex Regional Office nearest you. Outside the U.S., order through your local Dionex office or distributor. Refer to the following part numbers.

Product Description	Part Number
Acclaim OA, 5 µm, Analytical (4.0 × 150 mm) .....	062903
Acclaim OA, 5 µm, Analytical (4.0 × 250 mm) .....	062902
Acclaim OA, 5 µm, Guard Cartridges (4.3 × 10 mm), 2 each .....	062925
Acclaim Guard Kit (Holder and Coupler) .....	059526
Acclaim SST Guard Cartridge Holder .....	059456
Guard to Analytical Column Coupler .....	059457



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**Dionex Corporation**  
1228 Titan Way  
P.O. Box 3603  
Sunnyvale, CA  
94088-3603  
(408) 737-0700

**Dionex Corporation**  
Salt Lake City Technical Center  
1515 West 2200 South, Suite A  
Salt Lake City, UT  
84119-1484  
(801) 972-9292

**Dionex U.S. Regional Offices**  
Sunnyvale, CA (408) 737-8522  
Westmont, IL (630) 789-3660  
Houston, TX (281) 847-5652  
Atlanta, GA (770) 432-8100  
Marlton, NJ (856) 596-06009

**Dionex International Subsidiaries**  
Australia 61 (2) 9420 5233 Austria (01) 616 51 25 Belgium (03) 3-353 42 94 Canada (905) 844-9650 China (852) 2428 3282  
Denmark 36 36 90 90 France 01 39 30 01 10 Germany 06126-991-0 Italy (06) 66 51 50 52 Japan (06) 6885-1213 Korea 82 2 2653 2580  
The Netherlands (0161) 43 43 03 Switzerland (062) 205 99 66 United Kingdom (01276) 691722  
\* Designed, developed, and manufactured under an NSAI registered ISO 9001 Quality System.



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