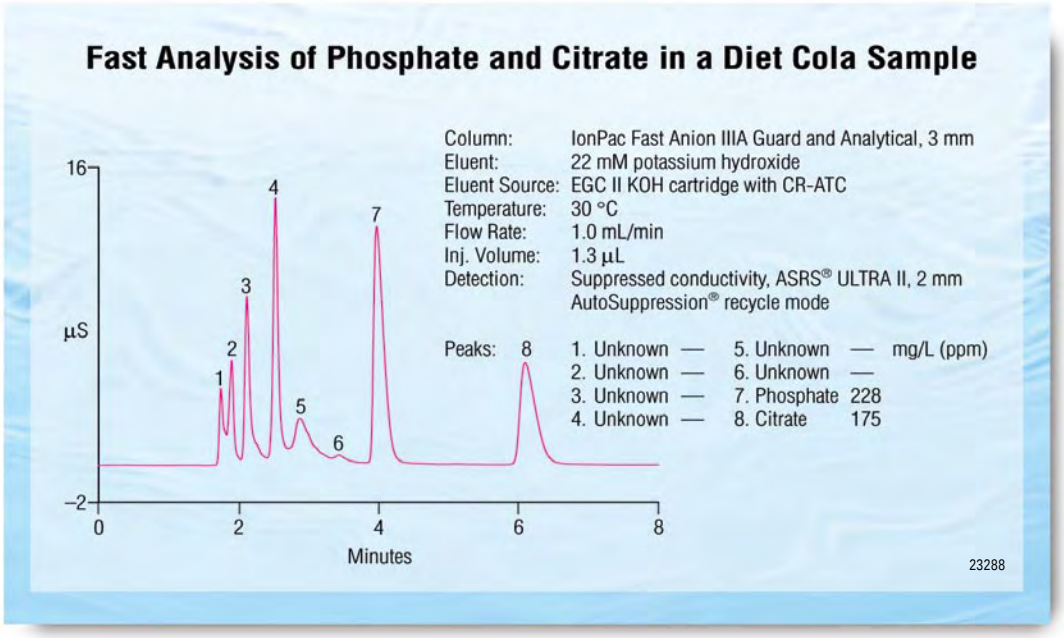
columns

# IonPac® Fast Anion IIIA Anion-Exchange Column




*The IonPac Fast Anion IIIA hydroxide-selective, anion-exchange column is designed for the fast analysis of phosphoric and citric acids in cola soft drinks. These acids can be analyzed in less than 7 min using an isocratic potassium hydroxide eluent delivered by an eluent generator in combination with suppressed conductivity detection. The Fast Anion IIIA column is rugged and reliable for this application.*

## Superior Chromatographic Performance

- Recommended hydroxide-selective, anion-exchange column provides fast analysis of phosphoric and citric acids in cola soft drinks.
- Use with eluent generator for simplified Reagent-Free™ Ion Chromatography (RFIC™) operation. Requires only a deionized water source to produce potassium hydroxide eluent.
- RFIC ensures excellent peak area and retention time precision for phosphoric and citric acid.
- 3-mm i.d. configuration provides economical operation.
- Eluent suppression using the ASRS ULTRA II or AAES® provides RFIC suppressed conductivity detection with low backgrounds and enhanced analyte sensitivity.
- Column selectivity is optimized for a 30 ºC operating temperature to ensure reproducible retention times in all environmental conditions.
- Column is compatible with organic solvents to enhance analyte solubility, modify column selectivity, or for effective column cleanup.

DIONEX

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## High-Efficiency Particle Structure

The IonPac Fast Anion IIIA was developed using a unique polymer-bonding technology and uses an anion-exchange resin with optimized selectivity and capacity (55 µeq/column) for fast analysis of phosphoric and citric acids. The stationary phase consists of a novel hyper-branched, anion-exchange condensation polymer, electrostatically attached to the surface of a wide-pore polymeric substrate. The substrate is surface-sulfonated in exactly the same manner as is common in Dionex latex-coated, anion-exchange materials. However, in this anion-exchange resin, alternating treatments of epoxy monomer and amines produce a coating that is grown directly off the substrate surface as illustrated in Figure 1. The resin capacity of the resin is controlled through the number of alternating coating cycles. The resulting polymer is extremely hydrophilic and therefore has excellent selectivity for hydroxide eluents, allowing the use of lower eluent concentrations.

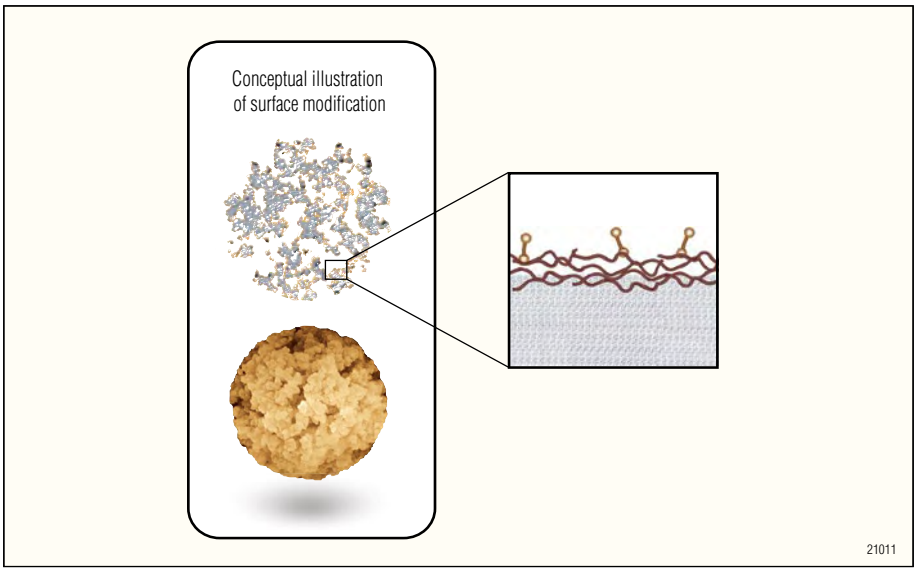


*Figure 1. Structure of an IonPac Fast Anion IIIA packing particle.*

## Determination of Phosphoric and Citric Acids in Cola Soft Drinks

Phosphoric acid is used as a stabilizer and preservative in cola soft drinks. It also influences flavor and gives cola drinks a tart taste. The phosphoric acid concentration in cola soft drinks is monitored to maintain product quality as well as minimize production costs. The phosphoric acid concentration is measured during the manufacturing of the cola syrup and during the bottling process of cola soft drinks. Citric acid is also used for the same purposes and may be used in combination with phosphoric acid.

The IonPac Fast Anion IIIA column provides rapid analysis of phosphoric and citric acids in cola soft drinks. The cola beverage samples may require sample pretreatment with sonication to remove carbonation. Sample dilution of cola syrups is recommended prior to analysis to ensure optimum column life. The IonPac Fast Anion IIIA column provides rapid analysis of phosphoric and citric acids in cola soft drinks or cola syrups in less than 7 min using a simple potassium hydroxide eluent generated by the eluent generator and detected with suppressed conductivity detection. Figures 2–4 illustrate the determination of phosphoric acid and citric acid in a variety of cola soft drink samples.

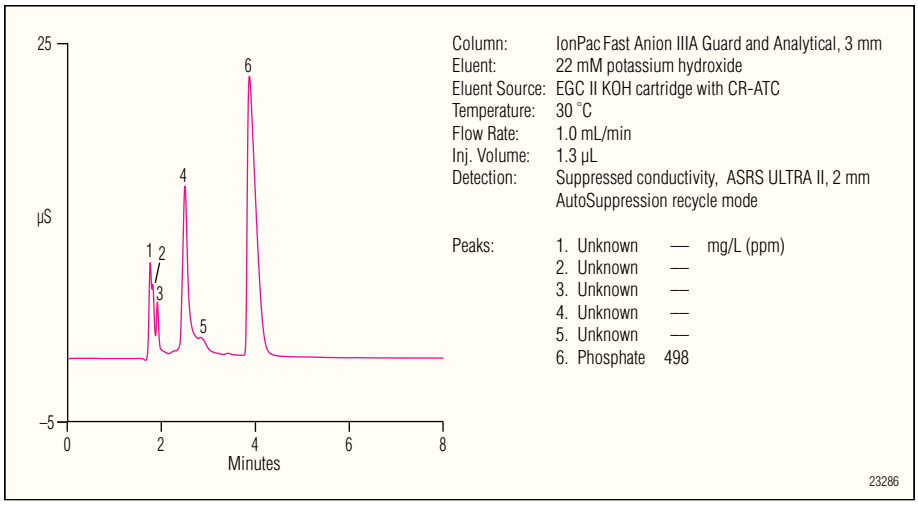


*Figure 2. Determination of phosphoric acid in a cola soft drink using the Fast Anion IIIA column.*

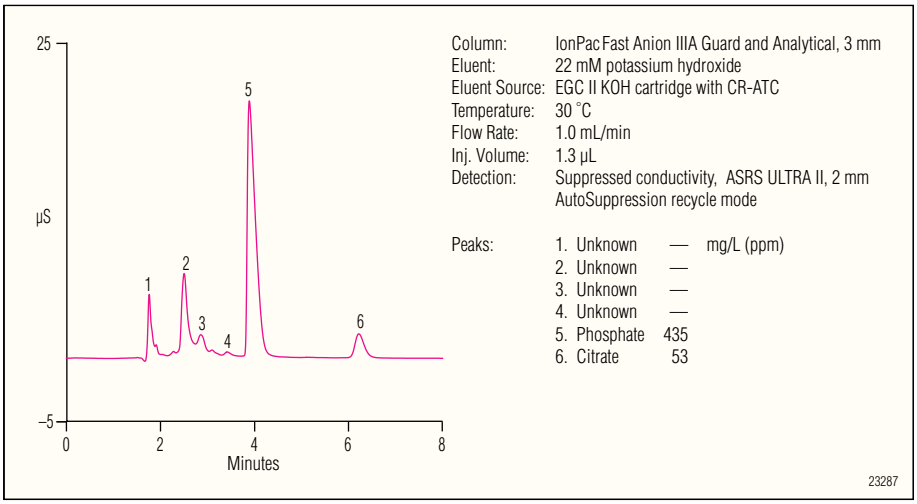


*Figure 3. Determination of phosphoric and citric acid in a cola soft drink using the Fast Anion IIIA column.*

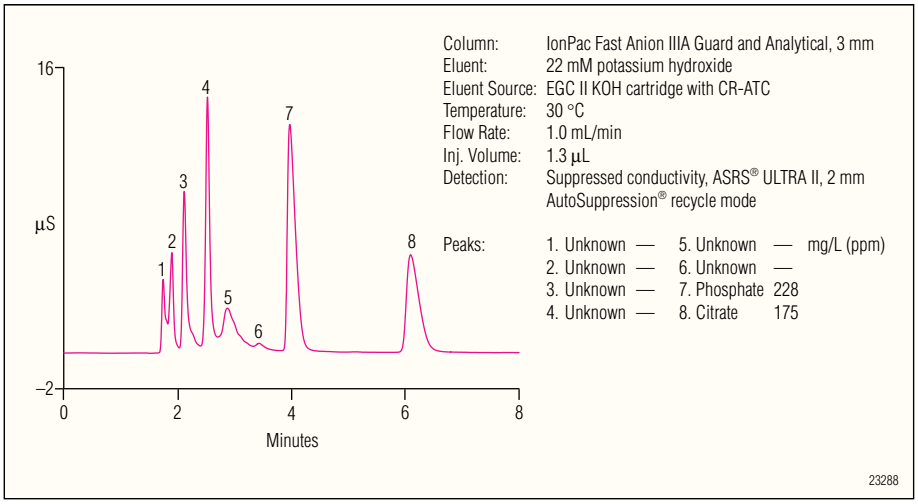


*Figure 4. Determination of phosphoric and citric acid in a diet cola soft drink using the Fast Anion IIIA column.*

## Gradient Separations as Simple as Isocratic Runs with the Eluent Generator and RFIC

The IonPac Fast Anion IIIA is recommended for use with eluent generation and a RFIC System. The eluent generator electrolytically produces high-purity potassium hydroxide eluent from water, eliminating the need for eluent preparation. The potassium hydroxide eluent produced by a RFIC System is free of carbonate contamination. Carbonate-free hydroxide eluents minimize baseline shifts during hydroxide gradients, provide greater retention time reproducibility, lower background conductivity, and lower detection limits for target analytes. Figures 5 and 6 illustrate the fast separation of anions in cola soft drink samples using a potassium hydroxide gradient with an eluent generator for eluent delivery. A potassium hydroxide gradient was used to provide optimum separation of the anions of interest. A CR-ATC Continuously Regenerated Anion Trap Column was used to remove carbonate from the source water to minimize the baseline shift during the gradient.

## Fast Separation of Chloride and Sulfate

The IonPac Fast Anion IIIA Column is ideal for fast analysis of chloride and sulfate in simple sample matrices. By using 15 mM potassium hydroxide eluent, these analytes can be determined in approximately 4 min, as illustrated in Figure 7.

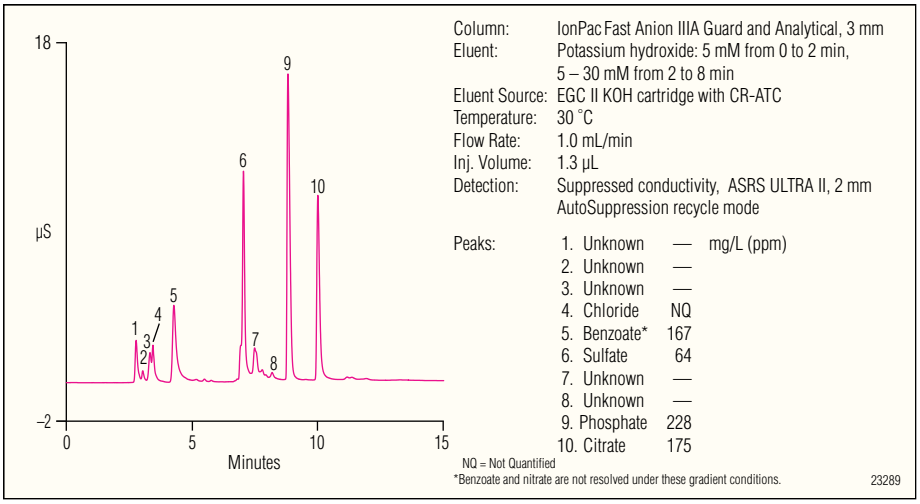


*Figure 5. Fast gradient separation of anions in a diet cola soft drink on an IonPac Fast Anion IIIA column.*

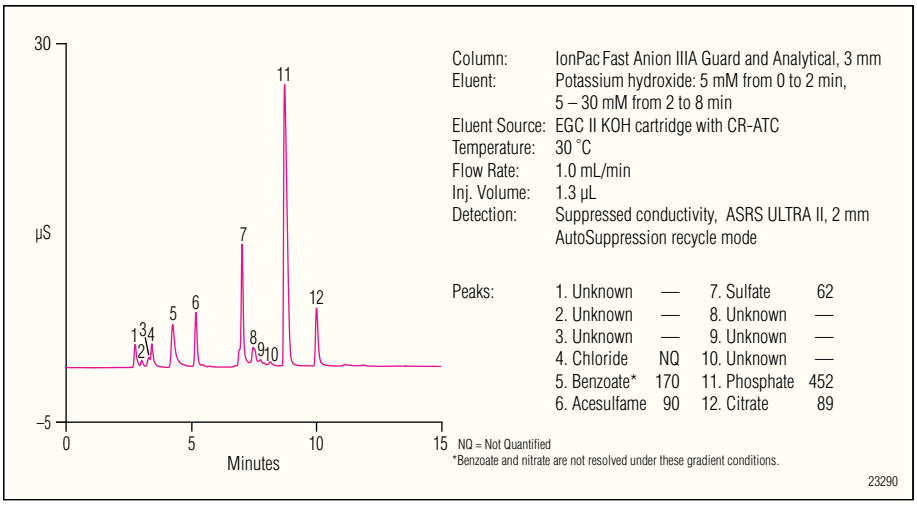


*Figure 6. Fast gradient separation of anions in a flavored diet cola soft drink on an IonPac Fast Anion IIIA column.*

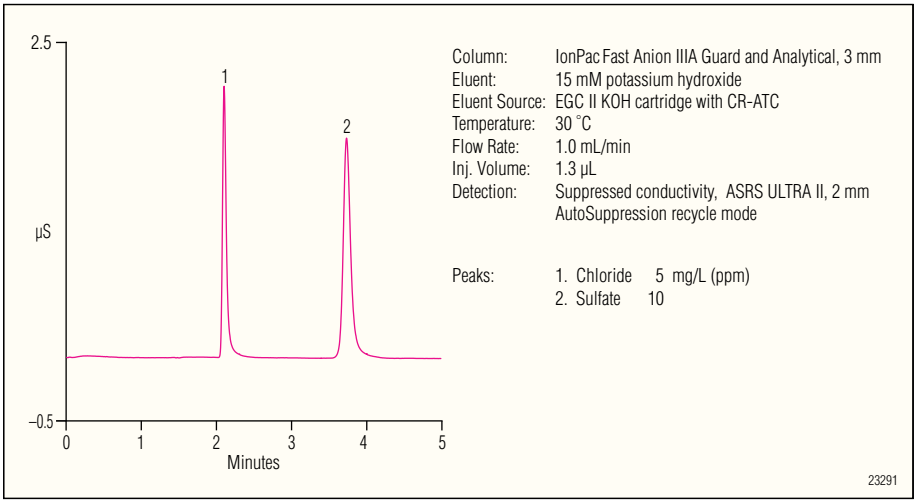


*Figure 7. Rapid analysis of chloride and sulfate on an IonPac Fast Anion IIIA column.*

### System Recommendations

The Fast Anion IIIA column is recommended for use with ICS-2000 or ICS-3000 IC Systems equipped with an eluent generator. The Fast Anion IIIA can be used with older Dionex IC systems equipped with an eluent generator or an RFC-30 Reagent-Free Controller. The eluent generator is used to automatically produce potassium hydroxide gradients from deionized water.

We recommend operating the IonPac Fast Anion IIIA column at an elevated temperature (30 ºC) to ensure reproducible retention times.

### Suppressor Recommendations

For optimum ease of use and economy, the IonPac Fast Anion IIIA column should be used with the ASRS Anion Self-Regenerating Suppressor (ASRS ULTRA II) or the Anion Atlas® Electrolytic Suppressor (AAES).

### Anion Trap Columns

When using the eluent generator for eluent delivery, a CR-ATC Continuously Regenerated Anion Trap Column should be installed between the EluGen® cartridge and the eluent generator degas module. As an alternative, an ATC-HC column can be installed between the pump outlet and inlet of the EluGen cartridge in the eluent generator module.

Alternatively, when performing sodium hydroxide gradient anion-exchange applications on the Fast Anion IIIA using hand-prepared bottled eluents, the ATC-3 Anion Trap column should be installed between the gradient pump and injection valve to remove anionic contaminants from the eluent.

### Concentrator Columns

For concentrator work, use the UTAC-LP1, UTAC-ULP1, UTAC-XLP1, TAC-LP1 or TAC-ULP1 Anion Concentrator column when the sample is delivered with a syringe or autosampler.

## SPECIFICATIONS

*Dimensions:*
IonPac Fast Anion IIIA Analytical Column:
3 × 250 mm
IonPac Fast Anion IIIA Guard Column:
3 × 50 mm

*Maximum Operating Pressure:*
3000 psi

*Mobile Phase Compatibility*
pH 0–14; 0–100% HPLC solvents

*Substrate Characteristics:*
Analytical Column (3 × 250 mm)
Resin: Supermacroporous
Bead Diameter (µm): 7.5 µm
Pore Size: 2000 Å
Cross-Linking (%DVB): 55%

Guard Column (3 × 50 mm)
Microporous
11.0 µm
<10 Å
55%

*Ion-Exchange Group:*
Functional Group: Alkanol quaternary ammonium ion

*Functional Group Characteristics:*
Hydrophobicity: Ultralow hydrophobic

*Capacity:*
55 µeq (3 × 250 mm column)
1.0 µeq (3 × 50 mm column)

*Column Construction:*
PEEK with 10-32 threaded ferrule-style end fittings. All components are nonmetallic.

## ORDERING INFORMATION

Order through your local Dionex office or distributor. Refer to the following part numbers:

| Product Description | Part Number |
|---|---|
| IonPac Fast Anion IIIA Analytical Column (3 × 250 mm) | P/N 062964 |
| IonPac Fast Anion IIIA Guard Column (3 × 50 mm) | P/N 062966 |
| CR-ATC Continuously Regenerated Anion Trap Column (for use with the EG50, ICS-3000, or ICS-2000 with built-in CR-TC control, the EG40 with EG40 CR-TC Add-On Kit or the RFC-30 Reagent-Free Controller) | P/N 060477 |
| ATC-3 Anion Trap Column (4 × 35 mm) (for use with 2- or 3-mm columns with conventional proportioned gradients) | P/N 059661 |
| ATC-HC Anion Trap Column (9 × 75 mm) (for use with the EG40 or EG50, if the CR-ATC is not used) | P/N 059604 |
| TAC-LP1 Trace Anion Concentrator Column (4 × 35 mm) | P/N 046026 |
| TAC-ULP1 Trace Anion Concentrator Column (5 × 23 mm) | P/N 061400 |
| UTAC-LP1 Ultra Trace Anion Concentrator Column - Low Pressure (4 × 35 mm) | P/N 063079 |
| UTAC-ULP1 Ultra Trace Anion Concentrator Column - Ultra Low Pressure (5 × 23 mm) | P/N 063079 |
| UTAC-XLP1 Ultra Trace Anion Concentrator Column - Extremely Low Pressure (6 × 16 mm) | P/N 063459 |



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