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## Analysis of Bromate in Drinking Water by HPLC and Postcolumn Derivatization

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**B**romate is a disinfection by-product that is formed when ozone reacts with naturally occurring bromide in drinking water. Bromate is a known animal carcinogen and has also been listed as a group 2B toxin: probable human carcinogen. U.S. EPA Method 300.1 employs conductivity as the means of detection, which works well for most anions. However, the method is nonspecific, and coeluting interferences cannot be identified. The more recent EPA Method 317.0 utilizes a bromate specific reagent in a postcolumn reaction. This allows for a very specific and sensitive assay for bromate in complex matrices.

### Method

#### Equipment

- LC with a binary pump
- UV-vis detector
- Pickering Laboratories dual reagent PCX5200 postcolumn derivatization instrument
- Pickering Laboratories anion-exchange column,  $4.6 \times 150$  mm (cat. no. 0785150)

#### Reagents

- 9.0 mM sodium carbonate
- Conc. nitric acid (70%)
- Potassium bromide
- *o*-Dianisidine dihydrochloride
- Methanol

#### LC Conditions

LC Column Temperature: 42 °C  
Sample Injection Volume: 250  $\mu$ L  
LC Flow Rate: 1.3 mL/min  
Mobile Phase: 9 mM  $\text{Na}_2\text{CO}_3$

#### Post-Column Conditions

Post-System: PCX5200  
Reactor Volume: 0.5 mL  
Reactor Temperature: 60 °C  
Reagent: *o*-Dianisidine dihydrochloride (Add 40 mL of 70%  $\text{HNO}_3$  to 300 mL deionized water in a 500 mL volumetric flask. Dissolve 2.5 g KBr in this solution. Dissolve 250 mg of *o*-dianisidine dihydrochloride in 100 mL of methanol and add to the nitric acid/KBr solution and dilute to volume.)

Flow Rate: 0.7 mL/min

Detection: UV-vis detector,  $\lambda_{\text{max}} = 450$  nm

### References

- (1) U.S.EPA Method 317.0, "Determination of inorganic oxyhalide disinfection by-products in drinking water using ion chromatography with the addition of a post-column reagent for trace bromate analysis."
- (2) H.P. Wagner, B.V. Pepich, D.P. Hautman, and D.J. Munch, *J. Chromatogr., A* **882**, 309–319 (2000).
- (3) C.R. Warner, D.H. Daniels, F.L. Joe, and G.W. Diachenko, *Food Additives Contaminants* **13**(6), 633–638 (1996).

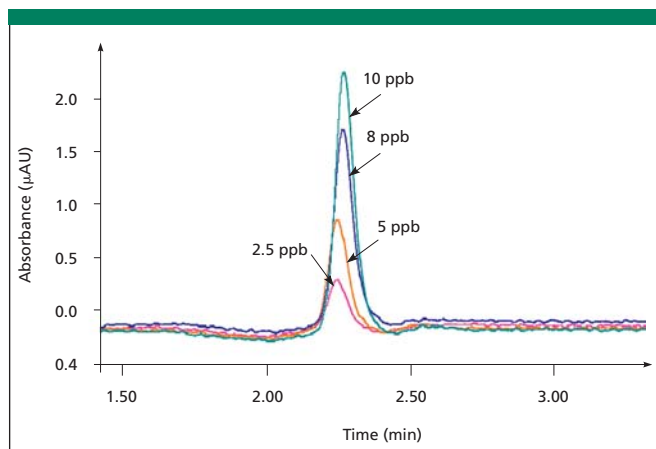


Figure 1: Chromatogram of bromate standard.

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