APPLICATION NOTE

As of: April, 2008

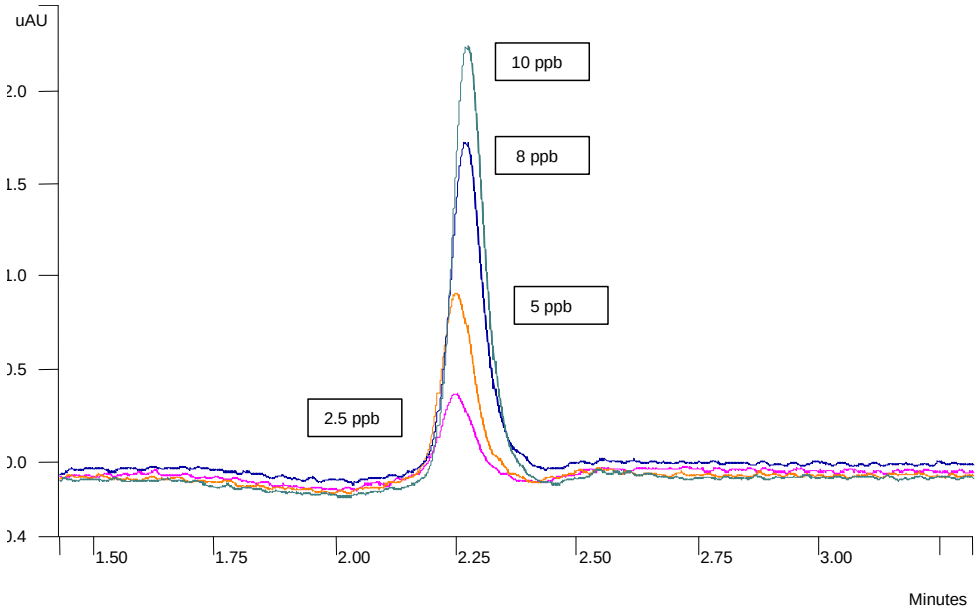
BROMATE

Bromate 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 also been listed as a group 2B toxin: probable human carcinogen. The U.S.EPA Method 300.1 employs conductivity as the means of detection which works well for most anions. However, the method is non-specific and coeluting interferences cannot be identified. The more recent EPA method 317.0 utilizes a bromate specific reagent in a post-column reaction. This allows for a very specific and sensitive (LOD about 1 ppb) assay for bromate in complex matrices.

Description of Method

Bromate reacts in a complex single-step reaction with the post-column reagents to from a dye that can be measured photometrical at 450 nm.

Chromatogram



Chromatogram of Bromate Standards

HPLC Conditions and Derivatization Parameters

HPLC	
Operation Mode	Isocratic
Eluant	9 mM sodium carbonate
Degassing	Helium- or vacuum-degassed
HPLC Column	Pickering anion exchange column, 4.6 x 150 mm
Column Oven	42 °C
Flow Rate	1.3 mL/min
Injection Volume	250 µL
Post-Column Derivatization	
Pinnacle PCX	Single-pump; 500 µL reactor
Reactor Volume	500 µL
Reactor Temperature	60 °C
Reagent	Add 40 mL of 70 % 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 dihydro-chloride in 100 mL of methanol, add to the nitric acid/KBr solution, and dilute to volume.
Reagent Flow	0.7 mL/min
Detection	
Detection Type	UV/VIS detection
UV/VIS	450 nm
Flowcell	Analytic; pressure stable up to 7 bar

Literature

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.Chromatography A, 882 (**2000**) 309 – 319.
3) C.R.Warner, D.H.Daniels, F.L.Joe and G.W.Diachenko, Food Additives and Contaminants, vol. 13, No.6 (**1996**) 633 – 638.

Order Information

Order Number	Description
1153-1022	PINNACLE PCX; single-pump, 500 µL reactor
0785150	Anion exchange column, 4.6 x 150 mm