



Bromate Analysis

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 has 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 U.S.EPA Method 317.0 utilizes a Bromate specific reagent in a post-column 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 Post-column derivatization instrument
- Pickering Laboratories anion-exchange column, 4.6 x 150mm (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 µL
LC FLOW RATE:	1.3 mL/min
MOBILE PHASE:	9 mM Na ₂ CO ₃

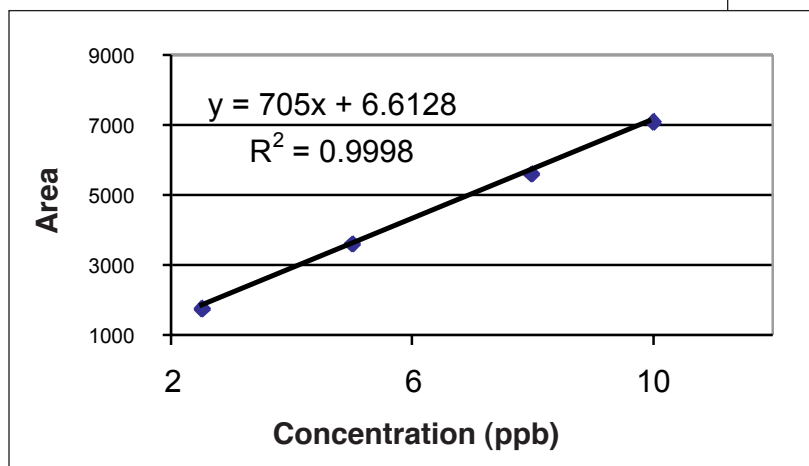
Analysis of Bromate in Drinking Water by HPLC and Post-column Derivatization

POST COLUMN CONDITIONS

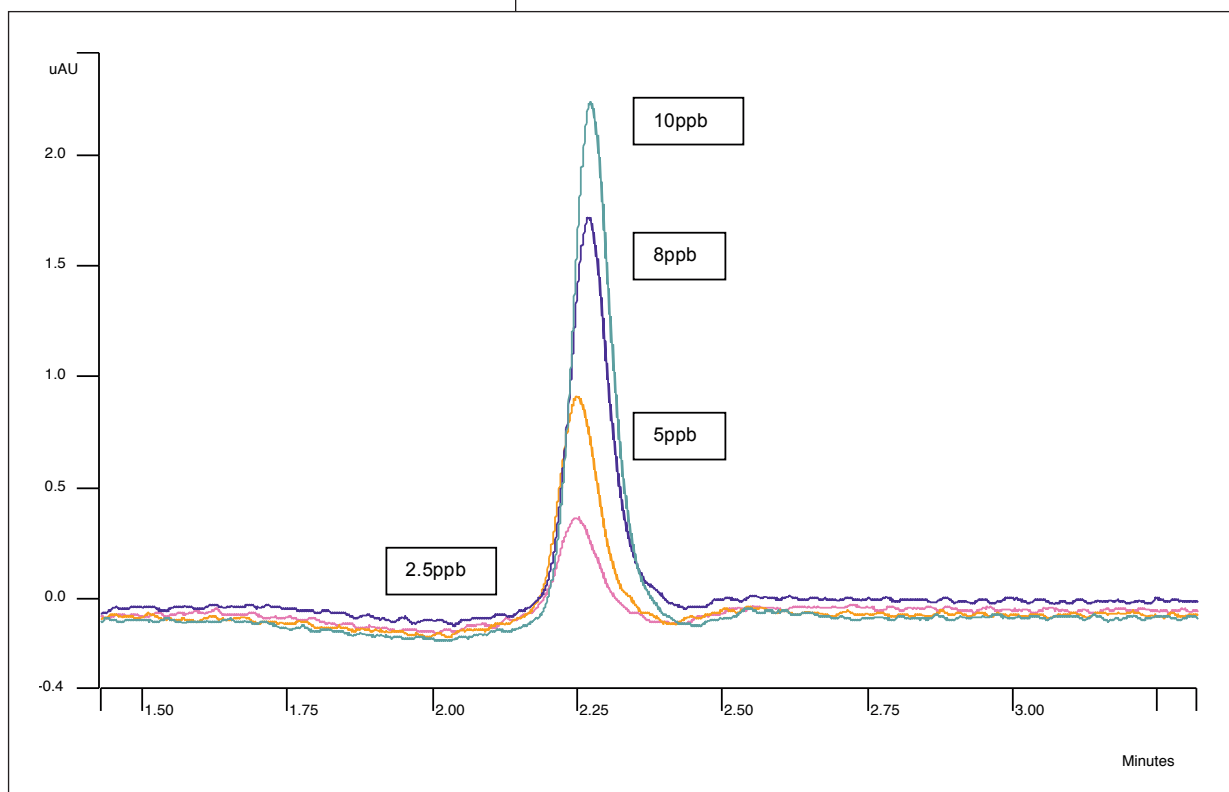
POST COLUMN SYSTEM:	Pinnacle PCX or Vector PCX
REACTOR VOLUME:	0.5 mL
REACTOR TEMPERATURE:	60°C
REAGENT:	<i>o</i> -Dianisidine dihydrochloride (Add 40 mL of 70% HNO ₃ to 300mL deionized water in a 500mL volumetric flask. Dissolve 2.5g KBr in this solution. Dissolve 250mg of <i>o</i> -Dianisidine dihydrochloride in 100mL of Methanol and add to the Nitric acid/KBr solution and dilute to volume.)
FLOW RATE:	0.7 mL/min
DETECTION:	UV/VIS detector, λ _{max} = 450 nm

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Calibration curve



Bromate Standards



REFERENCES

- 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.
- H.P.Wagner, B.V.Pepich, D.P.Hautman and D.J.Munch, J.Chromatography A, 882 (2000) 309 – 319.
- C.R.Warner, D.H.Daniels, E.L.Joe and G.W.Diachenko, Food Additives and Contaminants, vol. 13, No.6 (1996) 633 – 638.