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Note d'application

EPA Method 331.0 Determination of Perchlorates in Drinking Water by Liquid Chromatography Electrospray Ionization Mass Spectrometry

Waters Corporation

This is an Application Brief and does not contain a detailed Experimental section.

Abstract

This application brief demonstrates the determination of perchlorates in drinking water by Liquid Chromatography Electrospray Ionization Mass Spectrometry.

Introduction

Perchlorate is both naturally occurring and man-made. In its natural form, perchlorate is a contaminant in fertilizers. Man-made perchlorate is used in a wide variety of industrial applications including the production of rubber and paint, in lubricants, and as a primary ingredient in solid rocket propellant. Perchlorate is highly water soluble and can migrate into groundwater and surface water, posing a concern to drinking water supplies. Thirty-five states have detected perchlorate in drinking water at higher levels than expected. The United States Environmental Protection Agency (US EPA) has established an official reference of 0.0007 ppb per day of perchlorate. Maryland, Massachusetts, and New Mexico have established a one part per billion (ppb) action limit, while California and Texas have established 4 ppb limits.

Experimental

HPLC Conditions

Instrument:	Waters Alliance HPLC and Conductivity DSetector
Eluent:	25 mM ammonium bicarbonate, pH = 10 in 50% acetonitrile
Column:	Waters IC-Pak A/HR, 4.6 x 150 mm, 7 µm @ 30 °C
Injection:	100 µL
Flow Rate:	0.5 mL/min

Data:	Waters MassLynx Software

MS Conditions

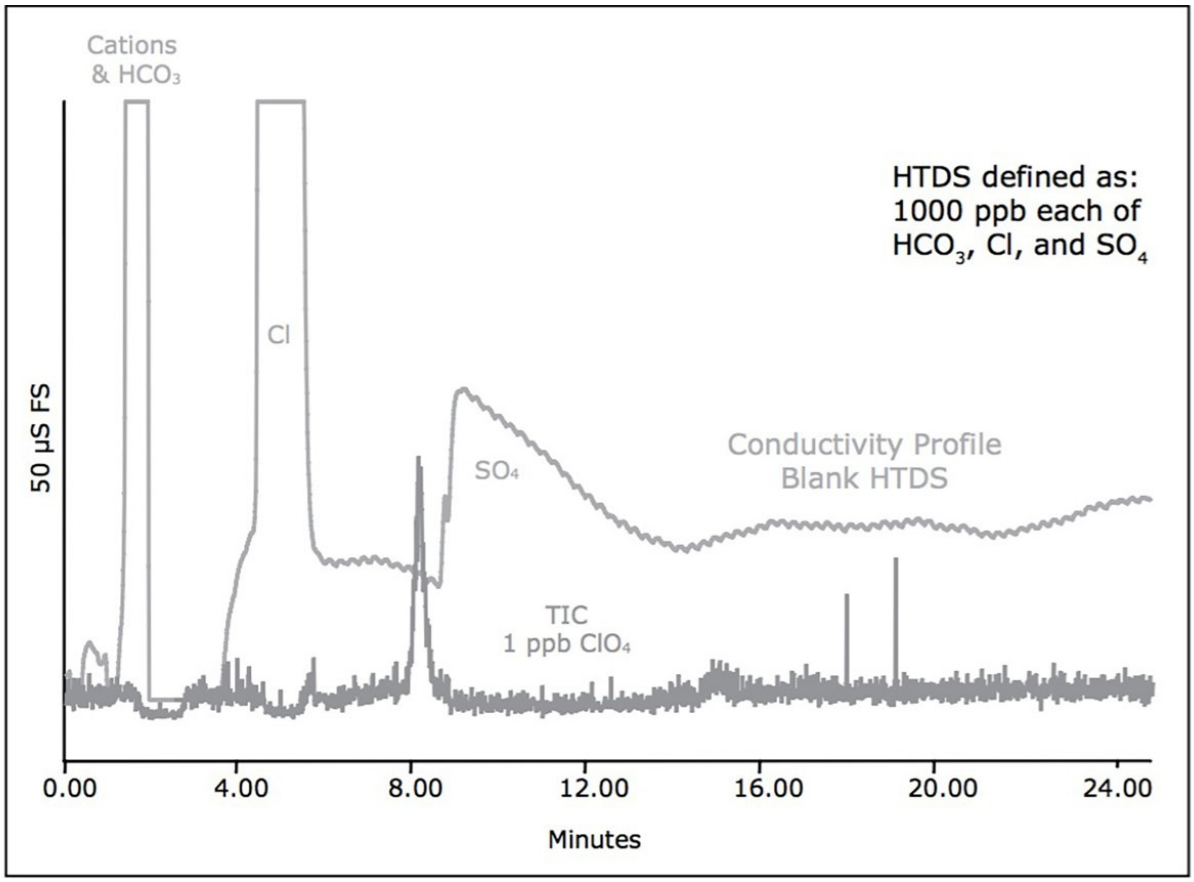
Instrument:	Waters TQ Detector or Quattro micro API Mass Spectrometer
Ion Mode:	Electrospray negative (ESI-)
Mode:	Multiple reaction monitoring (MRM). The MRM transitions, cone voltages (CV) and collision energies (CE) are listed below.

Compound	MRM Transition	CV	CE
Perchlorate (quantification)	99.1>82.7	40	30
Perchlorate (confirmation)	101.1>84.7	40	30
Internal Standard (Cl1804-)	107.1>88.7	40	30

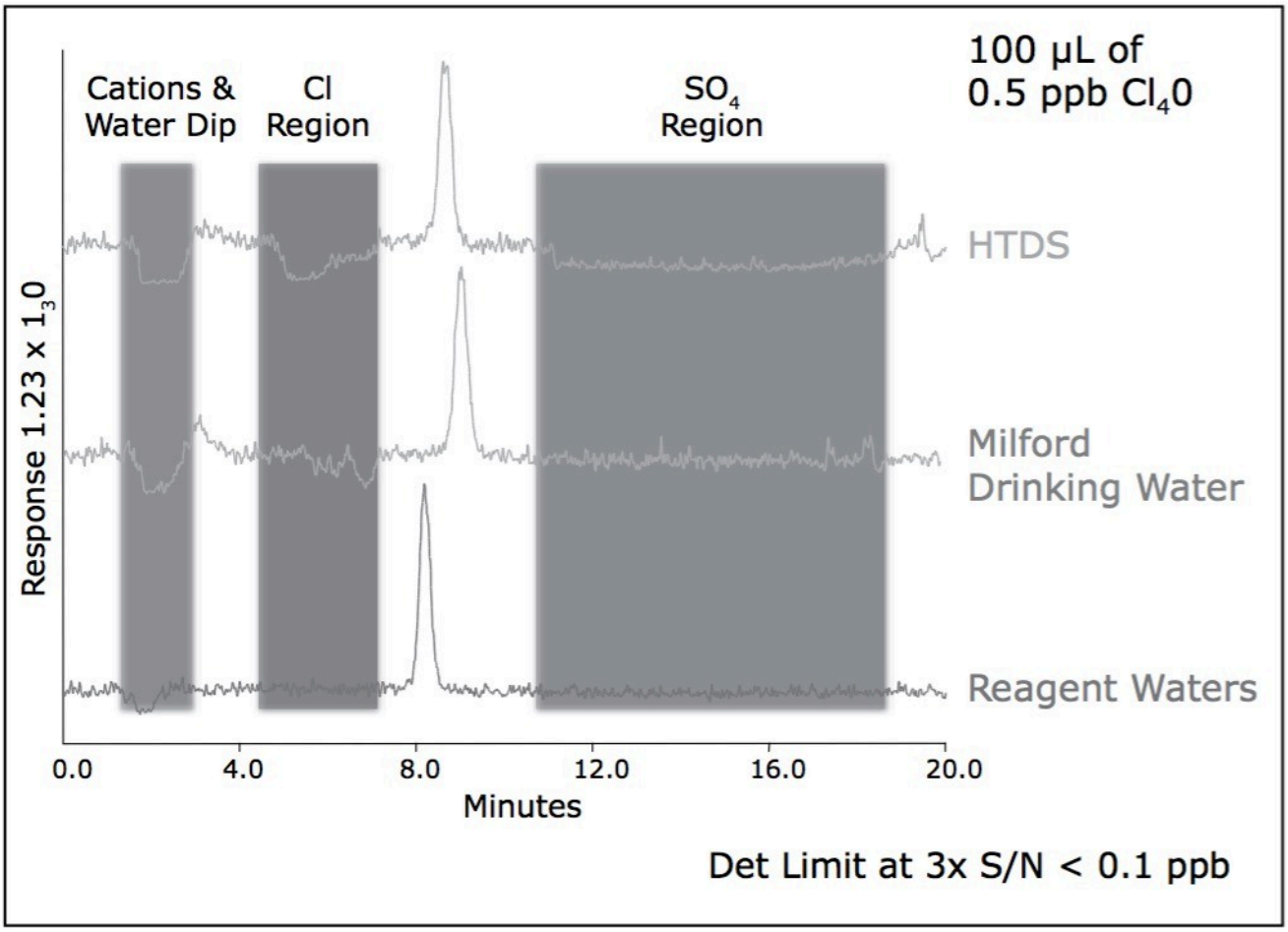
Optimized MRM transition parameters for EPA method 331.0 in ES-.

Sample Preparation

No sample pretreatment. Add internal standard.



1 ppb perchlorate in HTDS.



0.5 ppb perchlorate detection in three different sample matrices by LC-MS/MS. Analyzed on consecutive days with fresh eluent.

Related Literature	Literature Code
Environmental System Solutions	720001601EN
The Determination of Perchlorate in Water Using LC/MS/MS	720000941EN
The Determination of Perchlorate in Drinking Water Using Single Quadrupole Mass Spectrometry	720001285EN

www.waters.com/library

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- Alliance HPLC System <https://www.waters.com/534293>
- MassLynx MS Software <https://www.waters.com/513662>

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