

DRI DRINKING WATER TRACE ELEMENT ANALYSIS



DRI's trace chemistry laboratory includes two state-of-the-art Thermo Finnigan Element2 High Resolution-Inductively Coupled Plasma-Mass Spectrometry (HR-ICP-MS) instruments complete with autosampler for automated sample introduction. ICP-MS is a well-accepted technique for trace element concentration analysis. The instruments can operate in Low (LR), Medium (MR) and High (HR) resolution modes as needed for elimination of interferences and precise measurements. The instruments are optimized for long-term stability, excellent sensitivity and high signal-to-noise ratio. The two HR-ICP-MS and an Elga 18.2 mega ohm ultra-pure water system are housed in a 300 sq. ft. class 100 clean room. The trace chemistry laboratory also includes a 200 sq. ft. cold lab (-15°C), a 400 sq. ft. wet chemistry lab and a 150 sq. ft. sample storage freezer (-20°C). DRI's trace chemistry laboratory is dedicated to increasing the analytical capacity of water quality labs in developing countries through assessment of protocols and inter-laboratory comparisons.

For elemental analysis of drinking water samples, standard EPA procedures are followed. All standards are made from a mixed stock standard solution. All samples and standards are matrix matched. Calibration for elemental concentrations includes five standards and a blank. Quality Control (QC) is conducted using a blank and a check standard every 10 samples. Random samples are run in duplicate to test reproducibility. Typical drinking water elemental suite includes ~21 elements (see following page).

For fluoride (F-) analysis of drinking water samples, EPA procedures also are followed. Fluoride concentration is determined using an ion-selective electrode, a typical technique for fluoride concentration analysis. The Fluoride system is complete with an automated titrator and an autosampler for sample introduction. Standards are made from a commercially prepared single element stock. Calibration for elemental concentrations includes six standards and a blank. QC is conducted using a check standard, a spiked sample and a duplicate sample.

Two DRI staff members prepare samples for analysis in DRI's clean room with the Thermo Finnigan Element2 high-resolution ICP-MS instrument in the background.



CONTACT

Dr. Monica Arienzo
Dr. Alan Heyvaert
Dr. Joe McConnell

PHONE: 775/673-7693; EMAIL: Monica.Arienzo@dri.edu
PHONE: 775/673-7322; EMAIL: Alan.Heyvaert@dri.edu
PHONE: 775/673-7348; EMAIL: Joe.Mcconnell@dri.edu



DRI DRINKING WATER CHEMICAL ANALYSIS

ELEMENT	TYPICAL DETECTION LIMIT (PPB)	WHO GUIDELINE (PPB)
Ag	0.03	NG
Al	0.16	NG
As	0.03	10
Ba	0.07	700
Be	0.08	NG
Cd	0.03	3
Co	0.03	NG
Cr	0.02	50
Cu	0.04	2000
Fe	0.27	NG
Mn	0.04	NG
Mo	0.16	NG
Ni	0.04	70
Pb	0.03	10
Sb	0.01	20
Se	0.09	40
Sr	0.08	NG
Tl	0.03	NG
U	0.05	30
V	0.03	NG
Zn	0.31	NG

Full drinking water elemental suite analysis consists of ~21 elements and full QA/QC of each sample set. Cost for the full drinking water suite of 25 or more samples is \$123.88 per sample. Please contact the lab for pricing of less than 25 samples.

ELEMENT	TYPICAL DETECTION LIMIT (PPB)	WHO GUIDELINE (PPB)
F-	0.10	1.5

Fluoride analysis of drinking waters includes QA/QC of all results. Cost is \$25.30 for sets of 1–15 samples and \$20.50 for 16 or more samples.