

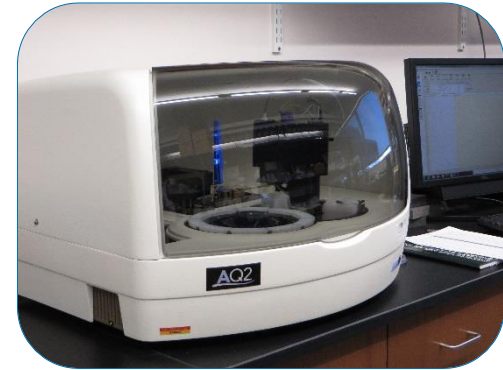
Water Quality Research Laboratory Method Price List

Laboratory Supervisor: Dr. Michelle Soupir
Email: msoupir@iastate.edu | Phone: (515)-294-2307

Laboratory Manager: Leigh Ann Long
Email: lalong@iastate.edu | Phone: (515)-294-4241

Water Analysis

Instrument: AQ2 Discrete Autoanalyzer (Seal Analytical; Mequon, WI)



Analyte	Detection Limit	Method Range	Method Description	AQ2 Method number	Method reference [†]	Sample Size (minimum)	Cost (per sample) [‡]
Nitrogen							
<i>Ammonia/Ammonium</i>	0.004 mg N/L	0.02-2.0 mg N/L	Alkaline phenate with hypochlorite and sodium nitroprusside (indophenol blue).	EPA-103-A Rev. 10	EPA 350.1, rev. 2.0 (1993) SM 4500-NH ₃ -G	25 mL	\$7.00
	0.05 mg N/L	0.2-10 mg N/L		EPA-129-A Rev. 8			

<i>Nitrate+nitrite</i> ¹	0.003 mg N/L	0.012-2.0 mg N/L	Cadmium reduction.	EPA-127-A Rev. 7	EPA 353.2, rev. 2.0	25 mL	\$7.00
	0.03 mg N/L	0.25-15 mg N/L		EPA-114-A Rev. 7	SM 4500-NO ₃ ⁻ -F	25 mL	\$7.00
<i>Nitrite</i>	0.0006 mg N/L	0.015-1.5 mg N/L	Colorimetric (sulfanilamide).	EPA-112-A Rev. 0	EPA 354.1, rev. 2.0 (1993)	25 mL	\$7.00
<i>Total Kjeldahl nitrogen (TKN)</i> ²	0.07 mg N/L	0.2-4.0 mg N/L	Kjeldahl digests (copper catalyst) are reacted with alkaline salicylate in the presence of hypochlorite and sodium nitroprusside.	EPA-111-A Rev. 5	EPA 351.2, rev. 2.0 (1993) SM 4500-N(org)-D	250 mL	\$14.00
<i>Total Kjeldahl nitrogen (TKN)</i> ²	0.12 mg N/L	0.5-25.0 mg N/L	Kjeldahl digests (copper catalyst) are reacted with alkaline salicylate in the presence of hypochlorite and sodium nitroprusside.	EPA-136-A Rev. 4	EPA 351.2, rev. 2.0 (1993) SM 4500-N(org)-D	250 mL	\$14.00

¹Nitrate alone can be determined by difference when analysis for both nitrate+nitrite and nitrite are performed.

²Total Kjeldahl nitrogen (TKN) measures ammonia+organic N, but not nitrate. It is not appropriate for samples >10 ppm nitrate. TKN may be performed simultaneously with total Kjeldahl phosphorus. If so, the per sample charge is \$21.00, which covers both analytes.

Analyte	Detection Limit	Method Range	Method Description	AQ2 Method number	Method reference [†]	Sample Size (minimum)	Cost (per sample) [‡]
Phosphorus							
<i>Reactive phosphate (aka orthophosphate), dissolved³ or total</i>	0.002 mg P/L	0.01-1.0 mg P/L	Ascorbic acid reduction, measured photometrically at 880 nm.	EPA-118-A Rev. 5	EPA 365.1, rev. 2.0 (1993)	25 mL	\$7.00
	0.005 mg P/L	0.05-5.0 mg P/L		EPA-145-A Rev. 1	SM 4500-P-F		
<i>Total phosphorus (persulfate oxidation)</i> ⁴	0.003 mg P/L	0.01-1.0 mg P/L	Hydrolysis of some organic P compounds	EPA-119-A Rev. 6	EPA 365.1, rev. 2.0 (1993)	250 mL	\$14.00

	0.006 mg P/L	0.05-5.0 mg P/L	and polyphosphates to orthophosphate via acid persulfate autoclave digestion.	EPA-134-A Rev. 4	SM 4500-P-B.5, -F		
<i>Total dissolved phosphorus (persulfate oxidation)</i> ³	0.003 mg P/L	0.01-1.0 mg P/L	Hydrolysis of some organic P compounds and polyphosphates to orthophosphate via acid persulfate autoclave digestion.	EPA-119-A Rev. 6	EPA 365.1, rev. 2.0 (1993) SM 4500-P-B.5, -F	250 mL	\$14.00
	0.006 mg P/L	0.05-5.0 mg P/L		EPA-134-A Rev. 4			
<i>Total Kjeldahl phosphorus (TKP)</i> ⁵	0.009 mg P/L	0.04-3.2 mg P/L	Kjeldahl digests (Cu catalyst) are reacted with acidic molybdate and antimony with ascorbic acid reduction.	EPA-135-A Rev. 5	EPA 365.4 (1983)	250 mL	\$14.00

³Samples may be filtered (0.45 µm) for dissolved analysis prior to submission to the WQRL, or we can filter for you at an additional \$3.00/sample.

⁴Total phosphorus via persulfate digestion is not appropriate for samples containing high amounts of sediment. TKP may be more appropriate for these samples.

⁵May be performed simultaneously with total Kjeldahl nitrogen (TKN). If so, the sample charge is \$21.00, which covers both analytes.

Other Parameters							
Analyte	Detection Limit	Method Range	Method Description	AQ2 Method number	Method reference[†]	Sample Size (minimum)	Cost (per sample)[‡]
Chloride	0.56 mg/L	2 to 100 mg/L	Mercuric thiocyanate reaction in the presence of ferric nitrate.	EPA-105-A Rev 5	SM 4500-Cl-E	25 mL	\$7.00
Silica (molybdate-reactive)	0.1 mg silica/L	0.25-25 mg silica/L	Acidic molybdate, no reduction (molybdo-silicic acid)	EPA-121-A Rev. 2	EPA 370.1 (1983) SM 4500-SiO ₂ -C	25 mL	\$7.00
Sulfate	1.0 mg SO ₄ /L	5-40 mg SO ₄ /L	Turbidimetric method with barium sulfate.	EPA-123-A Rev. 5	EPA 375.4 (1983)	25 mL	\$7.00

Microbiological Testing



Analyte	Detection Limit	Method Description	Method Reference [†]	Sample Size (minimum)	Cost
<i>E. coli</i> , <i>Enterococcus</i> , <i>Salmonella</i>	20 CFU/100 mL	Membrane filtration	SM 9222-B	100 mL	\$7.00/plate

Miscellaneous Test Methods

Analyte	Instrument	Detection Limit	Method Description	Method Reference [†]	Sample Size (minimum)	Cost (per sample)
Conductivity	Accumet AB 30 conductivity meter	±1 µmho/cm	Potentiometric.	SM 2510-B	50 mL	\$3.00
pH	Orion 290A pH meter	±0.01 pH unit	Potentiometric.	SM 4500-H ⁺ -B	50 mL	\$3.00
HPLC analysis	Varian ProStar with UV photodiode array detector	Varies.	Appropriate for caffeine; select herbicide analyses.	Varies.	Depends on analyte.	\$14.00 (plus sample extraction costs)
Total suspended solids	Mettler Analytical Balance	1 mg/L	Dried at 105°C.	SM 2540-D	500 mL	\$7.00
Fixed and volatile solids	Mettler Analytical Balance	1 mg/L	Ignited at 550°C.	SM 2540-E	500 mL	\$3.50

Instrument: Cary 8454 UV/Vis Diode Array Spectrophotometer (Agilent Technologies, Santa Clara, CA)



Analyte	Detection Limit	Method Description	Method Reference [†]	Sample Size (minimum)	Cost
Chlorophyll- <i>a</i> , <i>b</i> , <i>c</i> and pheophytin	TBD	Extraction with 90% acetone followed by spectrophotometric analysis.	SM 10200-H.2	500 mL	\$20.00/sample
Self-use (for example, to annotate spectrum peaks, acquire absorption data). Training by WQRL staff is required.	Varies by analyte. Spectrum range: 190-1100 nm.	1 cm quartz and plastic cuvettes available.	-	Varies by analyte.	\$10.30/hour (billable by the half-hour).

[†]EPA = *Methods for the Determination of Metals and Inorganic Chemicals in Environmental Samples* (U.S. Environmental Protection Agency). Edition is referenced.

SM = *Standard Methods for the Examination of Water and Wastewater* (American Public Health Association *et al.*). Current edition (22nd ed., 2012) is referenced unless otherwise specified.

‡Per sample charges are for unknown samples only. These charges cover all consumables and reagents, and standard and quality control samples.