Nitrate+Nitrite-Nitrogen in Water and Wastewater

Enzymatic (T178)

0.01 – 1.0 mg/L as N

1.0 Scope and Application

1.1 This method describes the determination of nitrate + nitrite in drinking, ground, surface, domestic and industrial waters.

1.2 The applicable range is 0.01 – 1.0 mg/L NO_3+NO_2 as N. Higher concentrations may be determined following sample dilution. Sample throughput is approximately 20 determinations per hour.

1.3 Sample analysis is achieved using the rAPID-T™ analyzer and the accompanying software package.

2.0 Method Summary

Nitrate is reduced quantitatively to nitrite enzymatically using the nitrate reductase enzyme (NaR) with its natural reducing agent, reduced nicotinamide dinucleotide (NADH). The nitrite thus formed plus any originally present in the sample is determined as an azo dye at 540 nm following its diazotization with sulfanilamide and subsequent coupling with N-1-naphthylethylenediamine. These reactions take place in acidic solution.

3.0 Data from Validation Run

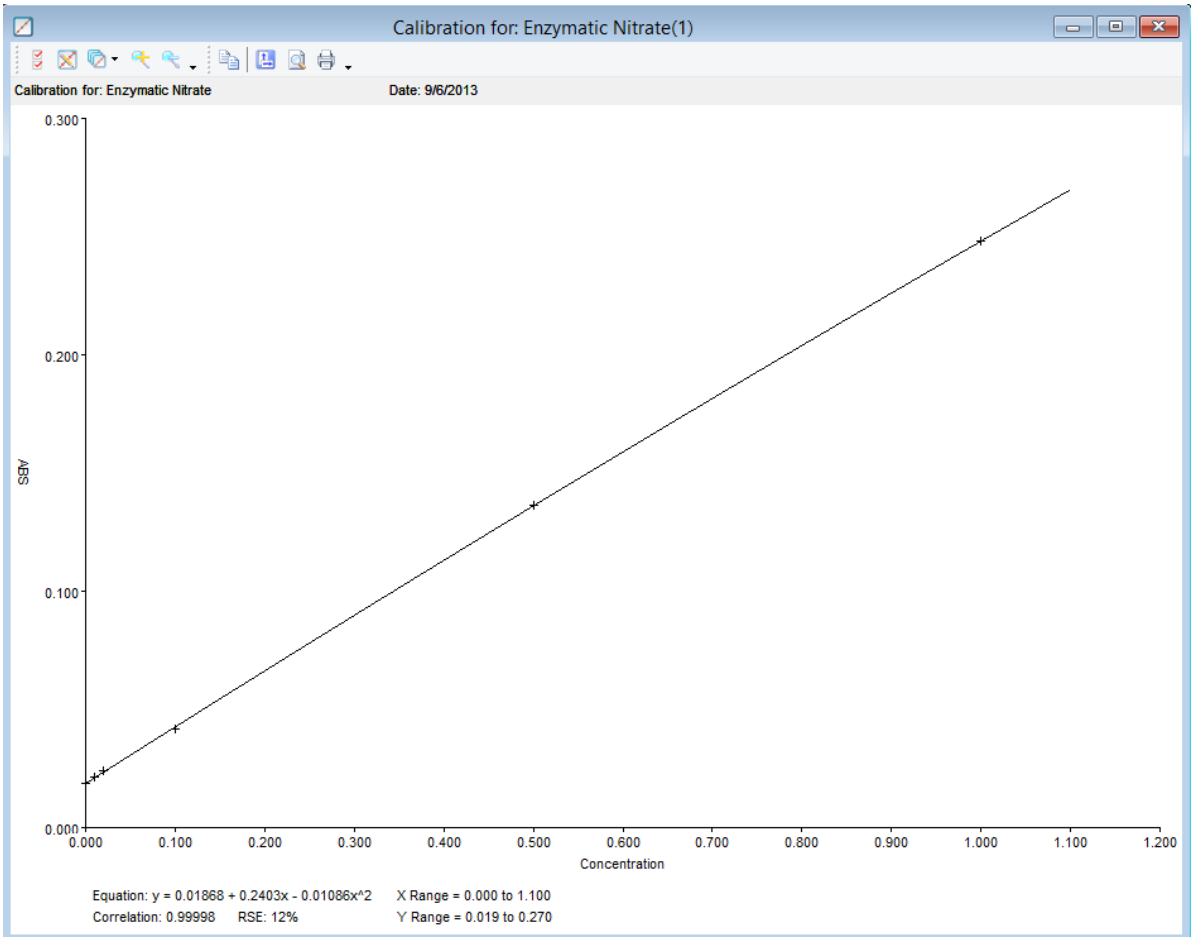
A validation of the NITRATE+NITRITE ENZYMATIC METHOD was completed with a calibration range of 0.01 – 1.0 mg/L

4.0 SAMPLE TABLE

Sample Table

	Number of Samples: 7				Tests	Dilutions	
Row	Cup	ID	Reps	Comment	Enzymatic Nitrate	Pre-Dil	Manual
1	19	NO2 1.0	1		☑	1	1
2	20	0.01 ppm	10		☑	1	1
3	21	blank	1		☑	1	1
4	22	0.1 ppm	10		☑	1	1
5	21	blank	1		☑	1	1
6	23	1.0 ppm	10		☑	1	1
7	21	blank	1		☑	1	1

5.0 Example of Calibration Curve, Method T178, Range 0.01 – 1.0 ppm as N



Equation: y = 0.01868 + 0.2403x – 0.0186x^2
X Range: 0.000 to 1.100
Y Range: 0.019 to 0.270
Correlation: 0.99998
RSE: 12%
Calibration Standards (in ppm):

C1	0.000
C2	0.010
C3	0.020
C4	0.100
C5	0.500
C6	1.00

6.0 RUN DATA

	Sample Info		Enzymatic Nitrate		
Row	Cup	ID	Abs	ppm	Well
1	C1	C1	0.019	0.000	A02
2	C2	C2	0.021	0.012	A03
3	C3	C3	0.024	0.022	A04
4	C4	C4	0.042	0.096	A05
5	C5	C5	0.136	0.501	B02
6	C6	C6	0.248	1.000	B03
7	19	NO2 1.0	0.269	1.096	B04
8	20	0.01 ppm	0.020	0.007	B05
9	20	0.01 ppm	0.021	0.010	C02
10	20	0.01 ppm	0.021	0.010	C03
11	20	0.01 ppm	0.021	0.010	C04
12	20	0.01 ppm	0.020	0.005	C05
13	20	0.01 ppm	0.021	0.009	D02
14	20	0.01 ppm	0.021	0.010	D03
15	20	0.01 ppm	0.021	0.010	D04
16	20	0.01 ppm	0.021	0.008	D05
17	20	0.01 ppm	0.021	0.011	E03
18	21	blank	0.019	0.000	A02
19	22	0.1 ppm	0.043	0.103	A03
20	22	0.1 ppm	0.043	0.103	A04
21	22	0.1 ppm	0.043	0.100	A05
22	22	0.1 ppm	0.043	0.103	B02
23	22	0.1 ppm	0.043	0.103	B03
24	22	0.1 ppm	0.044	0.105	B04
25	22	0.1 ppm	0.043	0.101	B05
26	22	0.1 ppm	0.043	0.100	C02
27	22	0.1 ppm	0.043	0.103	C03
28	22	0.1 ppm	0.043	0.101	C04
29	21	blank	0.018	-0.002	C05
30	23	1.0 ppm	0.259	1.050	D02
31	23	1.0 ppm	0.263	1.068	D03
32	23	1.0 ppm	0.261	1.058	D04
33	23	1.0 ppm	0.259	1.050	D05
34	23	1.0 ppm	0.256	1.038	E04
35	23	1.0 ppm	0.256	1.034	E05
36	23	1.0 ppm	0.245	0.987	F02
37	23	1.0 ppm	0.244	0.982	F03
38	23	1.0 ppm	0.251	1.013	F04
39	23	1.0 ppm	0.253	1.022	F05
40	21	blank	0.019	0.000	G02

Reduction Efficiency