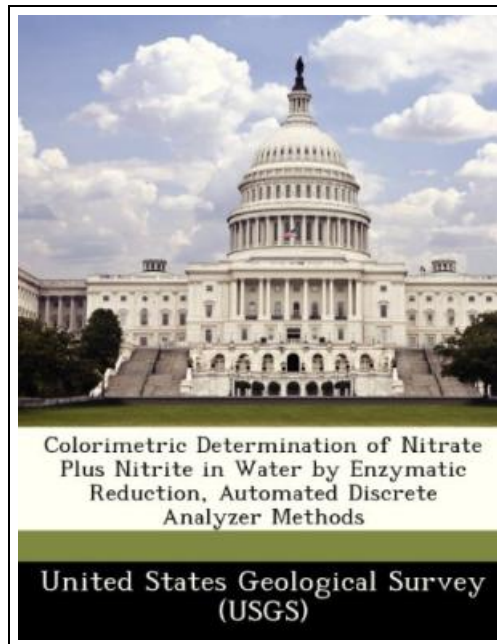


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COLORIMETRIC DETERMINATION OF NITRATE PLUS NITRITE IN WATER BY ENZYMATIC REDUCTION, AUTOMATED DISCRETE ANALYZER METHODS

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Bibliogov, United States, 2012. Paperback. Book Condition: New. 246 x 189 mm. Language: English . Brand New Book ***** Print on Demand *****.This report documents work at the U.S. Geological Survey (USGS) National Water Quality Laboratory (NWQL) to validate enzymatic reduction, colorimetric determinative methods for nitrate + nitrite in filtered water by automated discrete analysis. In these standard- and low-level methods (USGS I-2547-11 and I-2548-11), nitrate is reduced to nitrite with nontoxic, soluble nitrate reductase rather than toxic, granular, copperized cadmium used in the longstanding USGS automated continuous-flow analyzer methods I-2545-90 (NWQL laboratory code 1975) and I-2546-91 (NWQL laboratory code 1979). Colorimetric reagents used to determine resulting nitrite in aforementioned enzymatic- and cadmium-reduction methods are identical. The enzyme used in these discrete analyzer methods, designated AtNaR2 by its manufacturer, is produced by recombinant expression of the nitrate reductase gene from wall cress (*Arabidopsis thaliana*) in the yeast *Pichia pastoris*. Unlike other commercially available nitrate reductases we evaluated, AtNaR2 maintains high activity at 37 C and is not inhibited by high-phenolic-content humic acids at reaction temperatures in the range of 20 C to 37 C. These previously unrecognized AtNaR2 characteristics are essential for successful performance of discrete analyzer nitrate + nitrite assays (henceforth, DA-AtNaR2) described here. Method detection levels (or limits; MDL) estimated for standard- and low-level DA-AtNaR2 nitrate + nitrite methods were 0.02 milligrams nitrogen per liter (mg-N/L) and 0.002 mg-N/L, respectively, which are comparable to 2010 NWQL long-term MDLs of the continuous-flow analyzer, cadmium-reduction methods (henceforth, CFA-CdR) they replace. Typically, reagent-water blanks for standard- and low-level DAAtNaR2 nitrate + nitrite methods are one half MDL or less. Nitrate + nitrite concentration differences for between-day replicates were 3 percent or less at or above 5 times the MDL and were as great as 35 percent near the MDL. Typically, nitrate.



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