Trilogy™ Laboratory Fluorometer

Application Note:
Nitrate/Nitrite Reagents and Procedures Using LaMotte Test Kit Method

The LaMotte Nitrate Test Kit Method can be used with Turner Designs Trilogy Nitrate/Nitrite Module (P/N: 7200-074) to estimate nitrate concentrations in natural water samples. Traditional methods use cadmium columns, which can be expensive, difficult to maintain and prepare, and require a great deal of analytical techniques. The LaMotte Test Kit Method uses copper cadmium granules in powder form to easily and quickly reduce nitrate. Estimates resulting from this method are comparable to the traditional cadmium column reduction estimates. LaMotte Test Kit Method with Trilogy's Nitrate/Nitrite Module is able to resolve nitrate concentrations of up to 1000uM with an MDL of 3uM (0.04ppm).

LaMotte Test Kit Reagents

LaMotte Nitrate Reagents (NCR) purchased from Forestry Suppliers (Cat. No. 77101) include:

Mixed Acid Solution

2%	Acetic Acid
<1%	Copper Sulfate
<17%	Ammonium Chloride
10%	Sodium Chloride
4%	Citric Acid
2%	Sodium Phosphate
to 100%	Water

Nitrate Reducing Reagent

10%	Manganous Sulfate
7%	Cadmium Powder

Experimental Procedure

This procedure requires a Turner Designs Trilogy Laboratory Fluorometer (P/N: 7200-000) with Nitrate/Nitrite Absorbance Module (P/N: 7200-074) for detection of nitrate/nitrite in water and a LaMotte Nitrate Test Kit, which may be purchased from Forestry Supplier, Inc. (Nitrate-Nitrogen Model NCR; Cat. No. 77101).

Blanking

1. Make sure blank sample is at room temperature.
   [Note: A blank sample should consist of Deionized Water or Artificial Sea Water]
2. Add 2.5ml of blank sample to a 13x100mm disposable screw cap test tube.
3. Add 2.5ml of Mixed Acid Solution to sample in tube and cap the tube.
4. Wait at least 2 minutes for the reaction to occur but not longer than 8 minutes.
5. Add 0.1g of the cadmium powder to the test tube and cap the tube.
6. Invert the test tube approximately 60 times in 1 minute.
7. Wait 10 minutes.
8. Put the Nitrate/Nitrite Module with 540nm filter paddle in the Trilogy fluorometer.
9. Make sure the Nitrate/Nitrite Module is snapped into place and close lid.
10. Turn on Trilogy fluorometer using the switch on the back panel.
11. Choose Absorbance from the application menu.
12. Verify the module inserted is the Nitrate/Nitrite Absorbance Module.
13. Pipette 3ml of processed blank sample into a 10x10mm Methacrylate cuvette.
14. Put the cuvette into the module and close lid.
15. Press the Calibrate button.
16. Wait for blanking to complete, remove cuvette.

Once the unit has been blanked, absorbance of samples may be measured by simply inserting a cuvette containing sample and pressing measure absorbance.

Sample Analysis

1. Follow steps 1-14 from Blanking using a standard solution or natural sample in place of a blank sample.
2. Press the “Measure Absorbance” button.
3. Record absorbance values.

Calibration

Nitrate standard stock solution may be purchased from Ricca Chemical Company (Cat. No. 5457-16).

1. Dilute stock solution to concentration(s) in your working range. It is recommended to make at least 3 calibration points throughout your working range to increase accuracy of calculated concentrations. Example, if working in a range of 15-35uM; you should choose at least 3 points spanning that range (i.e. 20, 25, and 30uM) and dilute stock standard to those concentrations.
2. Then follow steps 1-14 from Blanking.
3. Press the “Measure Absorbance” button.
4. Record absorbance values.
5. Plot the Concentration of standard solution (uM) vs. Absorbance value of solution (Abs.). The equation from the linear regression through these points can be used to calculate nitrate concentrations:

Concentration of (NO_3^-) in solution = $mx + b$

Where *m* is the slope of the regression, *x* is the absorbance reading of the sample, and *b* is the y-intercept.