

g. Nitrates

i. Why is this test important/What does it measure

Nitrogen is the most abundant element in the Earth's atmosphere, making up about 78% of the air around us. Nitrates are a form of nitrogen that all plants need to grow. When you purchase a bag of fertilizer, the first number on the bag represents the amount of available nitrogen for plants. For example, if you buy a hundred pound bag of 12-0-0 fertilizer, 12 pounds of that bag will be nitrogen. Nitrogen can be converted to nitrates through nitrogen fixing bacteria or lightning. Nitrogen fixing bacteria often exist in the roots of plants called legumes, such as clover or beans.

High levels of nitrogen in surface water can lead to increased plant growth. When those plants die, they rot. That decomposition process uses up oxygen so there is not as much available for fish and other life in the water. High nitrate levels in drinking water can prevent babies from carrying oxygen; hence the nickname "blue baby" syndrome (methemoglobinemia). Nitrates can enter a body of water through fertilizers, animal manure (including from pets, wildlife, or farm animals), failing human septic and sewage treatment systems, and decomposing plant material.

ii. Water Quality Standards

Current drinking water standards for nitrates, set by EPA are 10 mg/L nitrates (measured as nitrogen) [what does that mean]. Even levels below this can cause "blue baby syndrome" or shortness of breath in some infants. Surface water quality standards are 20 mg/L.

iii. How to conduct the test:

NOTE: THIS TEST HAS HAZARDOUS WASTE MATERIALS: PLEASE WEAR GLOVES & GOGGLES AND MAKE SURE WASTE IS DISPOSED OF PROPERLY.

1. All glassware must be cleaned with dilute HCL and rinsed with deionized water before the test is taken out to the lake. **Do not rinse with distilled water;** it contains ammonia (NH₃) which will interfere with the test. If you cannot rinse with deionized water; rinse all glassware with the sample water (i.e. water from the river).
2. Fill the sample bottle with sample water (Please note the difference between the sample bottle and the test tube; fill the sample bottle so you can re-do the test if needed).
3. Fill the test tube to the 2.5mL line with water from the sample bottle.
4. Dilute to 5 mL line with Mixed Acid Reagent. Cap the test tube and mix by inverting the test tube.
5. Use the .1 gram spoon to add one level measure of Nitrate Reducing Agent. Cap and invert the sample approximately 60 times in one minute.

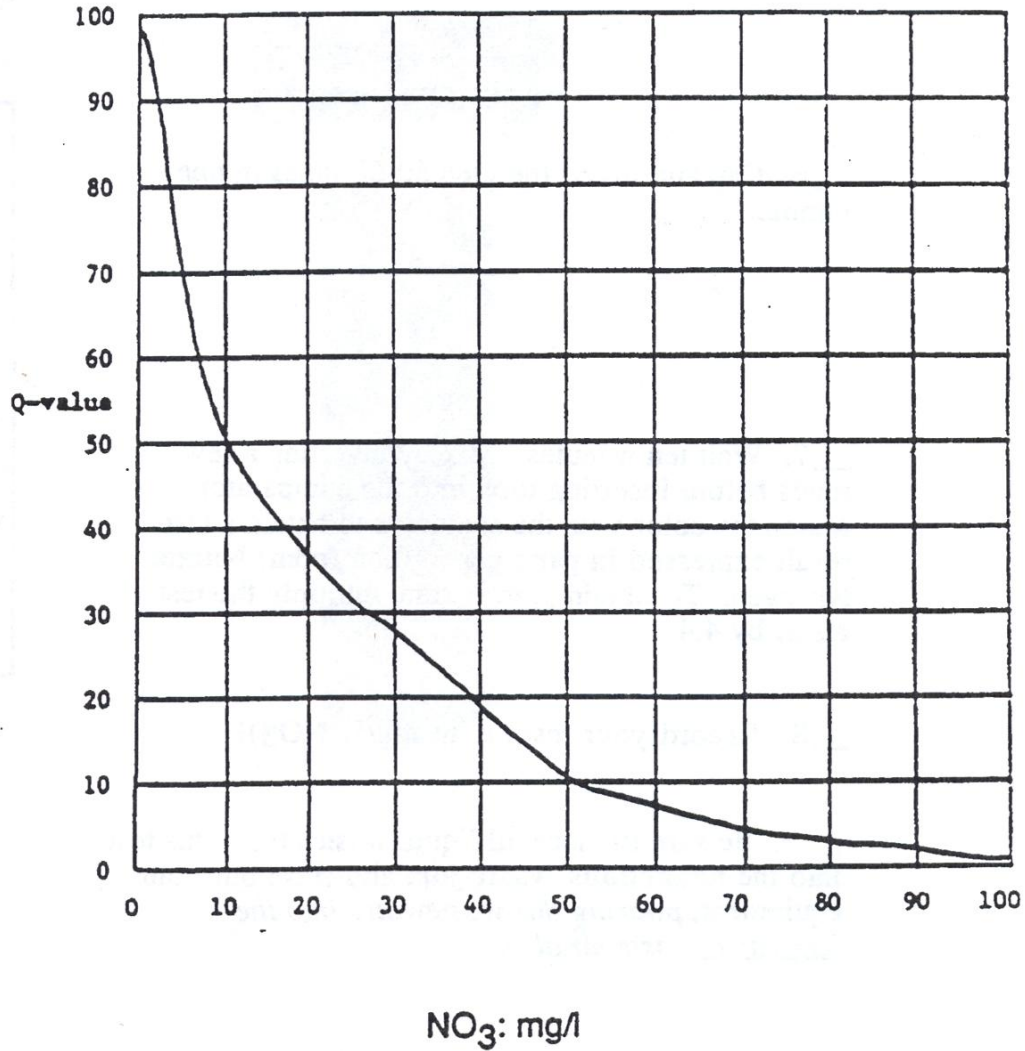


6. Wait 10 minutes
7. Insert the test tube into the Nitrate Comparator. Match the colors in the sample.
8. Record ppm Nitrate as Nitrate Nitrogen. To convert to Nitrates multiply by 4.4

iv. Determining the Q-Value

FIELD MANUAL FOR WATER QUALITY MONITORING

Chart 7: Nitrate (as NO_3)



Note: if $\text{NO}_3 > 100.00$, $Q = 1.0$