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PRODUCT DATA SHEET

KPD-46

AquaTru® Low Range Nitrate Test Kit

0.0 - 50.0 mg/L (ppm) Salt Water - Product Code 35940

PRODUCT DESCRIPTION:

GENERAL INFORMATION

In most aquarium situations, nitrate is the relatively stable end product of the oxidation of nitrite by nitrifying bacteria. Like ammonia and nitrite, nitrate is one of the intermediate compounds formed during the nitrogen cycle. However, nitrate is much less toxic than nitrite and unionized ammonia: In nature it is recycled by plants and bacteria to organic nitrogen which is utilized by animals for food. In an aquarium situation, this cycle occurs, but to a lesser degree than in nature since aquarium animals receive most of their food from an outside source. Algae, plants, and bacteria in an aquarium do use nitrates as food but perpetuation of the cycle only occurs when fish consume these as food. When the nitrates are not utilized to a significant degree, they become concentrated in the water. Rising nitrate concentration is also a useful indicator of decreasing water quality which can affect the growth and overall health of affected fishes and invertebrates. For this reason the level of nitrates should be monitored in aquariums and ponds (with appropriate water changes made when needed). Kordon's Low Range Nitrate Test Kit provides an easy, accurate means of monitoring low concentrations of nitrate in water. This is especially important with marine fishes and invertebrates that are especially sensitive, even to low levels of nitrates. This kit can be used in fresh water by multiplying the reading by 0.6.

AQUA-TRU ADVANTAGES

- 1) Fast and Accurate Readings of Low Levels of Nitrates: Reads in the range of appropriate for fishes and invertebrates especially sensitive to nitrate toxicity.
- 2) Highly stable powdered reagents. Sealed in foil pillows and dated to insure freshness.
- 3) Easy-to-Use Kit: simple step-by-step instructions and explanations.
- 4) Practical Expression of Nitrate Concentration: readings of nitrate are expressed as both as nitrate ion and as nitrate nitrogen.

CHEMISTRY OF COLOR REACTION

The reagents in the Low Range Nitrate Kit form a red colored complex in a two-step reaction sequence. The Low Range Nitrate Reagent chemically converts available nitrate to nitrite with cadmium. When the Nitrite Pillow is added, the nitrite reacts with two acids (sulfanilic and chromotropic) to form the red complex. The concentration of the nitrate in solution is proportional to the amount of the red compound that is formed.

INTERFERENCES

Since the nitrate in solution is converted to nitrite before the color compound is formed, any nitrite in solution will increase the apparent nitrate concentration. This should be of little concern in a well conditioned aquarium since nitrite concentrations will be very low with respect to nitrite levels. However, when conditioning an aquarium or pond, nitrite levels may be significant when compared to nitrate levels. In any such case, the nitrite test should be done in addition to the nitrate test for accurate levels. The nitrite reading (ppm NO₂) reading should be subtracted from the nitrate (ppm NO₃) reading to yield an accurate nitrate concentration.

Chloride will also interfere with the test; compensation for this interference has been made in the conversion factor provided.



GUIDELINES FOR ACCURATE TEST RESULTS

- 1) Rinse the color cube 2-3 times before collecting samples so that residual chemicals from previous tests do not interfere with results. It is suggested that tap water be used for the initial rinse so chemicals do not get into the water being sampled when the cube is dipped. Water being sampled should be used for final rinsing so that the residual rinse water won't affect the readings. Discard the rinse water each time so that residual chemicals are not poured into the aquarium or pond.
- 2) When collecting water samples, take care to obtain a representative sample. For example, collection near the bottom where organic compounds have accumulated can result in a higher reading. To check sampling techniques, two samples can be taken and tested; any variation in the results indicates that more care should be exercised when collecting samples. A recommended method is to (a) submerge the rinsed, capped cube to midwater, (b) open the cube and allow to fill, (c) cap while still submerged, and (d) drain water to correct level (discard excess).
- 3) Test the water sample immediately after collection. Time that elapses between water collection and analysis can affect test results.
- 4) When matching the test solution to the color comparator, use white paper as a background and read into normal daylight or incandescent light sources.

DIRECTIONS FOR USE

- 1) Following the "Guidelines for Accurate Tests Results", obtain a representative water sample for testing.
- 2) Open one reagent pillow marked LR NITRATE and add to the water sample, cap and mix for 1 1/2 minutes by inverting the test cube.
- 3) Open one reagent pillow marked LR NITRITE, add it to the water sample, cap and mix for 30 seconds.
- 4) Allow the mixture to react for 5 minutes and determine the nitrate concentration by matching the closest color on the comparator. After use, discard the contents of the cube and rinse with tap water. Do not return any rinse water to the aquarium or pond.
- 5) The reading given is for saltwater . For freshwater testing, multiply the comparator reading by 0.6 for the actual value.
- 6) Freshwater fish and invertebrates should be kept in the range of 35-70 mg/L nitrate or lower, and marine fish and invertebrates should be kept in water below 20 mg/L. Although tolerances to nitrates vary greatly among species, water changes should be performed when concentrations approach these levels.

STABILITY

The reagents should be used before the expiration date shown on the package. If the reagents are used after the expiration date they should be checked with an accurate standard solution to insure the reliability of the reagents. The color comparator strip should not be exposed to strong light sources for an extended length of time to prevent fading of the colors. The reagents should be stored in a cool place.

PACKAGING

Item Number	Product Description
35940	Low Range Nitrate Test Kit.
35740	Low Range Nitrate/Nitrite reagents- 10 ea. per package.
34422	Low Range Nitrate/Nitrite reagents- 50 ea. per package.



ORGANIC NITROGEN CONVERSIONS

A lot of confusion exists with regard to the expression of organic nitrogen (ammonia, nitrite and nitrate) concentrations. When dealing with organic nitrogen in aquarium or pond systems it is essential that one knows whether the concentration readings are expressed as ion concentration or as nitrogen concentration. Many commercial test kits do not explain how the organic nitrogen concentration is expressed. This can lead to serious, even lethal, miscalculations of organic nitrogen concentrations. The readings of nitrate concentrations in Kordon's Nitrate Kits are in units of nitrate ion and nitrate nitrogen (see explanation below); The ion concentration is in bold type, this is advantageous since toxicity concentrations are usually expressed as ion concentration. This eliminates the need for conversion of nitrate nitrogen to nitrate ion before comparison to toxicity charts. Concentrations expressed as nitrogen are more appropriate for organics in natural waters or in certain aquaculture measurements.

Nitrate nitrogen is that nitrogen present in water that is from nitrate ions in the solution. To convert nitrate ion readings to nitrate nitrogen values, divide the nitrate ion reading by 4.4; a nitrate ion concentration of 8.8 ppm = 2.0 ppm nitrate nitrogen (8.8 divided by 4.4). The conversion factor of 4.4 is based upon weight proportions of the nitrogen and oxygen in nitrate (4.4 grams of nitrate contain one gram of nitrogen).

The calculation of the conversion factor is as follows:

Nitrogen atomic weight: 14.01

Oxygen atomic weight: 16.00

Molecular weight NO₃ (nitrate): (M.W. nitrogen) + (3) (M.W. oxygen) = (14.01) + (3) (16.00) = 62.01

Nitrate nitrogen (i.e., the nitrogen from nitrate ion only) = 14.01 divided by 62.01 = 0.2259

Therefore, to convert nitrate nitrogen to nitrate ion concentration, multiply by 0.2259, which is the same as 1 divided by 0.2259 = 4.43 ~ 4.4.

Conversely, to convert nitrate nitrogen to nitrate ion concentration, multiply by the same factor of 4.4.

From this, one can see that without the knowledge of how a nitrate concentration is expressed, a 4.4-fold error can result.

CAUTIONS

This kit contains potentially harmful chemicals that can be dangerous if misused. Read label cautions carefully and exercise extreme care during handling, use and disposal of these chemicals. First aid instructions are available on the reagent packaging of each kit. This kit should not be used by children except under adult supervision. Following use, always clean hands, test apparatus, and test area well.