Ammonia - Hydroxybenzyl Alcohol (HBA) Method

Version 2 / Jun 2023

Applications and Industries

Drinking water, clean surface water, wastewater, stormwater
Not applicable for seawater analysis

References

Krom, Michael D., Spectrophotometric Determination of Ammonia: A Study of a Modified Berthelot Reduction Using Salicylate and Dichloroisocyanurate, The Analyst, V105, pp. 305-316 (1980)

Chemistry

Free ammonia reacts with hypochlorite to form monochloramine. Monochloramine reacts with hydroxybenzyl alcohol (HBA), in the presence of sodium nitroferricyanide, to form a green-colored complex. This method measures the sum of free ammonia and monochloramine. Results are expressed as ppm (mg/L) ammonia-nitrogen (NH_3-N). To convert results to ppm ammonia (NH_3), multiply by 1.22.

To differentiate between monochloramine and free ammonia:

1. *Determine the monochloramine + free ammonia concentration (as ppm NH_3-N):* Analyze the sample according to the kit instructions.
2. *Determine the monochloramine concentration (as ppm NH_3-N):* Analyze the sample, omitting the addition of A-1406 Activator Solution (hypochlorite).
   Note: To convert results from ppm NH_3-N to ppm monochloramine as chlorine (NH_2Cl-Cl_2), multiply by 5.
3. *Determine the free ammonia concentration (as ppm NH_3-N):* Subtract the result obtained in Step 2 (in ppm NH_3-N) from the result obtained in Step 1.

Storage Requirements

Products should be stored in the dark and at room temperature.

Shelf Life

When stored in the dark and at room temperature:

Visual colorimetric:

CHEMets and VACUettes refills, color comparators, Stabilizer Solution, Catalyzer Solution: at least 1 year
Activator Solution: at least 8 months

Instrumental colorimetric:

Vacu-vials kit: at least 8 months

Available Analysis Systems

Visual colorimetric: CHEMets®, VACUettes®
Instrumental colorimetric: Vacu-vials®

Interference Information

Concentration tolerances listed below apply to undiluted samples analyzed with CHEMets and Vacu-vials kits. Tolerances will be higher for diluted samples and VACUettes kits.

- Ammonia itself at levels significantly above the test range can cause false low or off-color test results. Samples suspected to contain ammonia at greater than 25 times the test range should be diluted prior to analysis.
- Nitrite up to at least 50 ppm as N can be tolerated. A negative bias may occur at higher nitrite concentrations.
- Calcium up to 1000 ppm as $CaCO_3$ can be tolerated. Higher calcium concentrations may cause false positive results.
- Magnesium up to 400 ppm as $CaCO_3$ does not interfere. At higher concentrations, magnesium may cause false positive results.
- Alkalinity up to approximately 400 ppm as $CaCO_3$ does not interfere. Higher alkalinity may cause false negative results.
- Sulfide up to 5 ppm does not interfere.
- Ferrous iron up to 20 ppm can be tolerated.
- Monoethanolamine (MEA) interferes positively, although it can be tolerated up to approximately 1 ppm. The interference is more pronounced at lower ammonia concentrations.
- Sample pHs between 3 and 11 can be tolerated; pHs outside this range may cause false negative results.
- DEHA above 30 ppm may cause a negative interference.
- Carbohydrazide above 20 ppm may cause a negative interference.
- These test kits are not applicable for seawater analysis.
- Sample color or turbidity may make a color match difficult during visual colorimetric testing and may cause a false positive result with instrumental colorimetric tests. CHEMetrics' Sample Zeroing Accessory Pack can be used to correct for potential errors during instrumental analysis.

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Accuracy Statement

Statements of accuracy are based on laboratory tests performed under ideal testing conditions using standards of known concentration prepared in deionized water.

CHEMets and VACUettes kits: ± 1 color standard increment

Vacu-vials kit, 0 - 3.00 ppm range:

≤ 0.10 ppm at 0 ppm (≤ 0.06 ppm with A-2024 SAM)
± 0.06 ppm at 0.20 ppm
± 0.15 ppm at 0.75 ppm
± 0.23 ppm at 2.25 ppm

Vacu-vials kit, 0 - 60.0 ppm range:

≤ 2.0 ppm at 0 ppm (≤ 1.2 ppm with A-2024 SAM)
± 1.2 ppm at 4.0 ppm
± 3.0 ppm at 15.0 ppm
± 4.5 ppm at 45.0 ppm

Safety Information

Safety Data Sheets (SDS) are available upon request and at www.chemetrics.com. Read SDS before using these products. Breaking the tip of an ampoule in air rather than water may cause the glass ampoule to shatter. Wear safety glasses and protective gloves.

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