O·I·Analytical

Method Abstract

Summary:

The sample is digested via Kjeldahl digestion prior to analysis in the presence of sulfuric acid, potassium sulfate, and a mercury catalyst at a final temperature of 380°C. Free ammonia and organic nitrogen compounds, such as amino acids, proteins, peptides, and other nitrogen compounds of biological origin, are converted to ammonium sulfate under these conditions. Nitrogenous compounds of some industrial wastes, such as amines, nitro compounds, hydrazones, oximes, semicarbazones, and some tertiary amines, may not be converted. The ammonium reacts with salicylate and hypochlorite in a buffered alkaline solution in the presence of sodium nitroferricyanide (pH 12.8–13) to form the salicylic acid analog of indophenol blue. The blue-green color produced is measured at 660 nm and is proportional to the concentration of total Kjeldahl nitrogen (TKN) present in the sample.

Interferences:

Precipitation of calcium and magnesium hydroxides is eliminated by potassium sodium tartrate in the working buffer. Filter or centrifuge turbid digestates prior to analysis. Digestates with background absorbances at the analytical wavelength may interfere with the analysis.

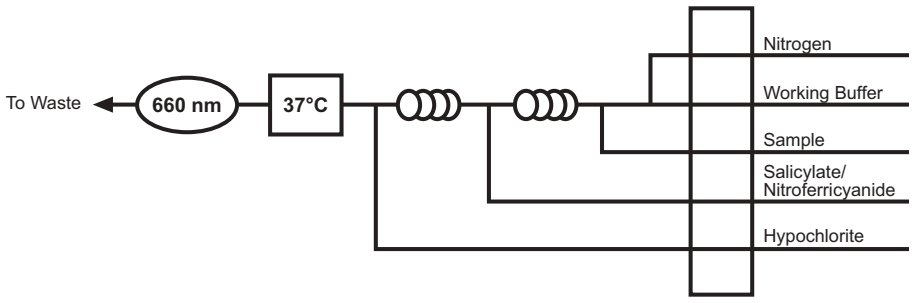
Performance Specifications:

Range:	0.05–10 mg/L nitrogen (N)	0.20–20 mg/L N
Throughput:	51 samples/hour	51 samples/hour
Precision:		
0.05 mg/L	<8% RSD	—
0.10 mg/L	<5% RSD	—
0.20 mg/L	—	<6% RSD
1.0 mg/L	<3% RSD	<4% RSD
10 mg/L	<2% RSD	—
20 mg/L	—	<3% RSD
Method Detection Limit (MDL):	0.01 mg/L N	0.01 mg/L N

Chemicals:

Ammonium Sulfate, $(NH_4)_2SO_4$
Brij®-35, 30% w/v
(OI Analytical Part #A21-0110-33)
Chloroform, $CHCl_3$
Hydrochloric Acid, concentrated, HCl
Potassium Sodium Tartrate Tetrahydrate, $KNaC_4H_4O_6 \cdot 4H_2O$
Potassium Sulfate, K_2SO_4
Red Mercuric Oxide, HgO
Sodium Hydroxide, NaOH
Sodium Hypochlorite, 5.25% or 6.0% available chlorine (household bleach), NaOCl
Sodium Nitroferricyanide Dihydrate, $Na_2Fe(CN)_5NO \cdot 2H_2O$
Sodium Phosphate Dibasic Anhydrous, Na_2HPO_4
Sodium Salicylate, $NaC_7H_5O_3$
Sulfuric Acid, concentrated, H_2SO_4
Teflon® or glass boiling stones

Basic Flow Diagram:



Note: This method complies with USEPA Method 351.2.

Selected Reference: *Methods for Chemical Analysis of Water and Wastewater;* EPA-600/4-79-020; U.S. Environmental Protection Agency, Office of Research and Development, Environmental Monitoring and Support Laboratory: Cincinnati, OH, 1984; Method 351.2.

(800) 653-1711
(979) 690-1711
www.oico.com
oimail@oico.com