Supelco®
Analytical Products

Application Note

Ammonium in effluents

Photometric determination using the indophenol blue method

Introduction

Ammonium is a key parameter in water testing, as it can have adverse effects on marine ecosystems if it is at high levels. One major issue is eutrophication, excessive plant and algal growth.[1] As a result, determining ammonium levels in effluents is critical to maintaining aquatic environments. In this application note, we describe the quantification of ammonium in effluents using the Spectroquant® photometric system with ammonium test kits.

Experimental

Method

Ammonium nitrogen (NH_4-N) occurs partly in the form of ammonium ions and partly as ammonia. A pH-dependent equilibrium exists between the two forms. In strongly alkaline solution ammonium nitrogen is present almost entirely as ammonia, which reacts with hypochlorite ions to form monochloramine. This in turn reacts with a substituted phenol to form a blue indophenol derivative that is determined photometrically. Due to the intrinsic yellow coloration of the reagent blank, the measurement solution is yellow-green to green in color.

The method is analogous to EPA 350.1, APHA 4500-NH3 F, ISO 7150-1, and DIN 38406-5.

Reagents and Instruments

Cat. No.	Product Description
Test Kits	
1.14739	Ammonium Cell Test method: photometric 0.010 - 2.000 mg/l NH_4-N; 0.01 - 2.58 mg/l NH_4^+ Spectroquant® or
1.14558	Ammonium Cell Test Method: photometric 0.20 - 8.00 mg/l NH_4-N; 0.26 - 10.30 mg/l NH_4^+ Spectroquant® or
1.14544*	Ammonium Cell Test Method: photometric 0.5 - 16.0 mg/l NH_4-N; 0.6 - 20.6 mg/l NH_4^+ Spectroquant® or
1.14559	Ammonium Cell Test Method: photometric 4.0 - 80.0 mg/l NH_4-N; 5.2 - 103.0 mg/l NH_4^+ Spectroquant® or
1.14752	Ammonium Test Method: photometric 0.010 - 3.00 mg/l NH_4-N; 0.013 – 3.86 mg/l NH_4^+ Spectroquant® or
Instruments	
1.73026	Spectroquant® VIS Spectrophotometer Prove 100 plus or
1.73027	Spectroquant® UV/VIS Spectrophotometer Prove 300 plus or
1.73028	Spectroquant® UV/VIS Spectrophotometer Prove 600 plus or
1.09748	Spectroquant® Photometer NOVA 30 or
1.09751	Spectroquant® Photometer NOVA 60 or
1.09752	Spectroquant® Photometer NOVA 60A or
1.73632	Spectroquant® Colorimeter Move 100
Materials	
1.14946	Rectangular cells 10 mm and/ or
1.14947	Rectangular cells 20 mm and/ or
1.14944	Rectangular cells 50 mm

*not compatible with Move 100
Also first generation Prove instruments are compatible and preprogrammed with this method.

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Analytical Approach

Sample preparation

Cloudy samples must be filtered before determination.

Analysis

Determine with the above mentioned test kits.

Calculation

Ammonium content in mg/l NH_4-N = analysis value in mg/l NH_4-N.

References

1. Camargo JA, Alonso A. Ecological and toxicological effects of inorganic nitrogen pollution in aquatic ecosystems: A global assessment. Environ Int. Aug 2006;32(6):831-49. doi:10.1016/j.envint.2006.05.002.

MilliporeSigma
400 Summit Drive
Burlington, MA 01803

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