O·I·Analytical

Method Abstract

Summary:

A known amount of soil or plant sample is digested using an appropriate procedure to convert the total phosphorus compounds to orthophosphate. The digestate is then analyzed for orthophosphate. Orthophosphate reacts with molybdenum(VI) and antimony(III) in an acidic solution to form an antimony-phosphomolybdate complex, which is subsequently reduced with ascorbic acid to form a blue color. The absorbance is measured at 660 nm.

Interferences:

Dialysis prior to color development removes most interferences. High concentrations of iron(III), copper, and silica may interfere. The presence of less than 50 mg/L of iron(III), less than 10 mg/L of copper, or less than 10 mg/L of silica in the final extract does not interfere with the analysis.

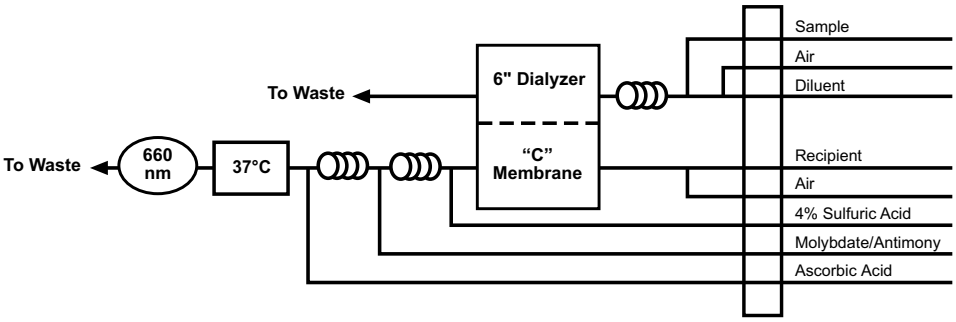
Performance Specifications:

Range:	0.2–100 mg/L
Throughput:	28 samples/hour
Precision:	
0.2 mg/L	<4% RSD
5.0 mg/L	<1% RSD
50 mg/L	<1% RSD
100 mg/L	<1% RSD
Method Detection Limit (MDL):	0.03 mg/L

Chemicals:

Ammonium Molybdate Tetrahydrate, $(NH_4)_6Mo_7O_{24}•4H_2O$
Antimony Potassium Tartrate Hemihydrate, $K(SbO)C_4H_4O_6•½H_2O$
Ascorbic Acid, $C_6H_8O_6$
DOWFAX® 2A1
(OI Analytical Part #A000080)
Hydrochloric Acid, concentrated, HCl
Mercuric Chloride, $HgCl_2$
Potassium Phosphate Monobasic, KH_2PO_4
Sodium Chloride, NaCl
Sodium Hydroxide, NaOH
Sulfuric Acid, concentrated, H_2SO_4

Basic Flow Diagram:



Selected References:

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 365.1.

Standard Methods for the Examination of Water and Wastewater, 20th ed.; American Public Health Association: Washington, D.C., 1998.

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