

Method Abstract

Summary:

The soft drink, which contains high concentration of orthophosphate typically due to the addition of phosphoric acid, is directly sampled, delivering a known aliquot of each sample to the analytical cartridge. The sample is then diluted within the cartridge prior to the reaction. The orthophosphate in the sample reacts with molybdenum(VI) and antimony(III) in an acidic medium to form an antimony-phosphomolybdate complex. This complex is subsequently reduced with ascorbic acid, producing a highly colored blue product. The absorbance of the final product is measured at 880 nm.

Interferences:

Interference by the caramel coloring of many soft drinks is minimized by measuring the absorbance at 880 nm instead of 660 nm. A bias between different soft drinks has been observed. However, by using this method for one specific beverage and calibrating with a matrix composed of the beverage without the phosphate, this bias should be eliminated. For accurate results, only one type of soft drink should be analyzed per calibration. Iron, copper, and other metals may interfere by binding with the orthophosphate in the sample and blocking the color formation reaction. Ethylenediaminetetraacetic acid (EDTA) is used in the buffer solution to eliminate this interference. Ferric iron at 50 mg/L or less, copper at 10 mg/L or less, and silica at 10 mg/L or less do not interfere.

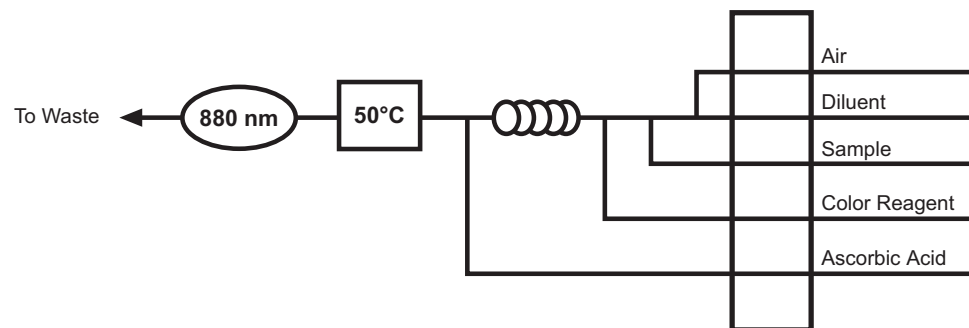
Performance Specifications:

Range:	100–700 mg/L PO ₄
Throughput:	36 samples/hour
Precision:	
100 mg/L	<0.5% RSD
300 mg/L	<0.5% RSD
700 mg/L	<0.5% RSD
Method Detection Limit (MDL):	0.05 mg/L PO ₄

Chemicals:

Ammonium Molybdate Tetrahydrate, (NH ₄) ₆ Mo ₇ O ₂₄ •4H ₂ O	Ethylenediaminetetraacetic acid Tetrasodium Salt Hydrate, C ₁₀ H ₁₂ N ₂ Na ₄ O ₈ •xH ₂ O
Antimony Potassium Tartrate Hemihydrate, K(SbO)C ₄ H ₄ O ₆ •½H ₂ O	Hydrochloric Acid, concentrated, HCl
Ascorbic Acid, C ₆ H ₈ O ₆	Potassium Phosphate Monobasic, KH ₂ PO ₄
DOWFAX® 2A1 (Part #A000080)	Sodium Hydroxide, NaOH
	Sulfuric Acid, concentrated, H ₂ SO ₄

Basic Flow Diagram:



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 365.1.

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