Supelco®

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Spectroquant®

Phosphate Cell Test

P

for the determination of orthophosphate

1. Method

In sulfuric solution orthophosphate ions react with molybdate ions to form molybdophosphoric acid. Ascorbic acid reduces this to phosphomolybdenum blue (PMB) that is determined photometrically.
The method is analogous to EPA 365.2+3, APHA 4500-P E, and DIN EN ISO 6878.

2. Measuring range and number of determinations

Measuring range	Number of determinations
0.5 - 25.0 mg/l PO_4-P **1.5 - 76.7 mg/l PO_4^{3-}** **1.1 - 57.3 mg/l P_2O_5**	25

For programming data for selected photometers / spectrophotometers see www.sigmaaldrich.com/photometry.

3. Applications

This test measures only orthophosphate.

Sample material:
Groundwater and surface water, seawater
Drinking water
Wastewater
Nutrient solutions for fertilization
Soils after appropriate sample pretreatment
Food after appropriate sample pretreatment

4. Influence of foreign substances

This was checked individually in solutions containing 15 and 0 mg/l PO_4-P. The determination is not yet interfered with up to the concentrations of foreign substances given in the table. Cumulative effects were not checked; such effects can, however, not be excluded.

Concentrations of foreign substances in mg/l or %							
Ag^+	1000	Cu^{2+}	1000	Ni^{2+}	1000	EDTA	1000
AsO_4^{3-}	**1.0**	F^-	250	NO_2^-	1000	Surfactants[1]	500
Ca^{2+}	1000	Fe^{3+}	1000	Pb^{2+}	100	Na-acetate	5 %
Cd^{2+}	1000	Hg^{2+}	50	**S^{2-}**	**10**	NaCl	20 %
CN^-	1000	Mg^{2+}	1000	SiO_3^{2-}	1000	$NaNO_3$	10 %
Cr^{3+}	1000	Mn^{2+}	1000	SO_3^{2-}	1000	Na_2SO_4	10 %
$Cr_2O_7^{2-}$	25	NH_4^+	1000	Zn^{2+}	1000		

Reducing agents interfere with the determination.
[1] tested with nonionic, cationic, and anionic surfactants

5. Reagents and auxiliaries

Please note the warnings on the packaging materials!

The test reagents are stable up to the date stated on the pack when stored closed at +15 to +25 °C.

Package contents:
1 bottle of reagent P-1K
1 bottle of reagent P-2K
25 reaction cells
1 blue dose-metering cap
1 sheet of round stickers for numbering the cells

Other reagents and accessories:
MQuant® Phosphate Test, Cat. No. 110428,
measuring range 10 - 500 mg/l PO_4^{3-} (3.3 - 163 mg/l PO_4-P)
MQuant® Universal indicator strips pH 0 - 14, Cat. No. 109535
Sulfuric acid 0.5 mol/l Titripur®, Cat. No. 109072
Spectroquant® CombiCheck 20, Cat. No. 114675
Spectroquant® CombiCheck 80, Cat. No. 114738
Hydrochloric acid 25 % for analysis EMSURE®, Cat. No. 100316

Pipette for a pipetting volume of 1.0 ml

6. Preparation

- Use only phosphate-free detergents to rinse glassware. Otherwise fill with hydrochloric acid (approx. 10 %) and leave to stand for several hours.

At the first use **replace the screw cap of the reagent bottle P-2K by the blue dose-metering cap**.
Hold the reagent bottle **vertically** and, at each dosage, press the slide **all the way** into the dose-metering cap. **Before each dosage** ensure that the slide is **completely retracted**.

⚠ **Reclose the reagent bottle with the screw cap at the end of the measurement series, since the function of the reagent is impaired by the absorption of atmospheric moisture.**

- Analyze immediately after sampling.
- Check the phosphate content with the MQuant® Phosphate Test. Samples containing more than 25.0 mg/l PO_4-P must be diluted with distilled water.
- **The pH must be within the range 0 - 10.**
  Adjust, if necessary, with sulfuric acid.
- Filter turbid samples.

7. Procedure

Pretreated sample (**10 - 35 °C**)	1.0 ml	Pipette into a reaction cell and mix.
Reagent P-1K	5 drops[1]	Add, close the cell tightly, and mix.
Reagent P-2K	1 dose	Add, close the cell tightly, and shake **vigorously until the reagent is completely dissolved**.
Leave to stand for 5 min (reaction time), then measure the sample in the photometer.		

[1] **Hold the bottle vertically while adding the reagent!**

Notes on the measurement:

- For photometric measurement the cells must be clean. Wipe, if necessary, with a clean dry cloth.
- Measurement of turbid solutions yields false-high readings.
- The pH of the measurement solution must be within the range 0.80 - 0.95.
- The color of the measurement solution remains stable for at least 60 min after the end of the reaction time stated above.

8. Analytical quality assurance

recommended before each measurement series
To check the photometric measurement system (test reagents, measurement device, handling) and the mode of working, Spectroquant® CombiCheck 20 and 80 can be used. Besides a **standard solution** with 8.0 mg/l PO_4-P (CombiCheck 20) or, respectively, 15.0 mg/l PO_4-P (CombiCheck 80) these arcticles also contain an **addition solution** for determining sample-dependent interferences (**matrix effects**).
Additional notes see under **www.qa-test-kits.com**.
For quality and batch certificates for Spectroquant® test kits see the website, where you will find all data in production control, that are determined in accordance with ISO 8466-1 and DIN 38402 A51.

9. Notes

- Reclose the reagent bottles immediately after use.
- **Information on disposal can be obtained at www.disposal-test-kits.com.**

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