Determination of Nitrite Content

Subject

Determination of the nitrite content in water by photometric method

Principle

This method can be applied to water with a nitrite content of at least 0.025 mg/L. The normal ion presence in tap water does not interfere with this procedure.

Due to the presence of nitrite in an acidic environment, part of the added sulfanilamide is diazotized. This diazotization forms with the added N-(l-Naphtyl)ethylenediamine, dihydrochloride a red azo-pigment.

The absorbance is determined at 542 nm.

The molar absorbance coefficient concerned on NO_2^- = 5000 L/(mole×mm)

Glassware, apparatus

1 Bulb pipette 2 ml
1 Bulb pipette 4 ml
1 Bulb pipette 6 ml
1 Bulb pipette 8 ml
1 Bulb pipette 10 ml
2 Bulb pipettes 20 ml
4 Measuring pipettes 10 ml
1 Volumetric flask 1000 ml
8 Volumetric flasks 100 ml
3 Beakers 50 ml
1 Beaker 600 ml
2 Stirring rods (small and large)
Spectrophotometer, suitable for measurements at 542 nm
Cuvette with a light path of 10 mm

Reagents and additives

Hydrochloric acid 6.0 mol/L
Na_2-EDTA 0.025 mol/L solution
Sulfanilamide 1 g/L solution
N-(l-Naphtyl)ethylenediamine-dihydrochloride 1 g/L solution
Nitrite solution, (NO_2^- content) 250 mg/L
Standard nitrite solution, NO_2^- content 5 mg/L (dilute 20.0 ml nitrite solution (250 mg/L) in a volumetric flask of 1000 ml and mix)

Sample solution

Assume an amount (V_o) of at most 80 mL, to contain between 2 and 1 00 µg NO_2^- and which has not beforehand been acidified *(the sample solution contains approximately 1 ppm nitrite).*

Procedure

Place the analysis sample in a volumetric flask of 100 mL and fill to approximately 80 mL. Add 2 mL Na_2-EDTA solution, 5 mL sulfanilamide solution and 2 mL hydrochloric acid. Add after 3 min 1 mL N-(1-Naphtyl)ethylenediamine-dihydrochloride solution. Fill up to the graduation mark and mix. Determine after at least 15 min the absorbance (A_x) at 542 nm against water.

Proceed in the same way for a blank determination of water (absorbance A_b). Calculate the corrected absorbance ($\rho(NO_2^-)$)

$A'_x = A_x - A_b$

Make a calibration graph of 5 solutions with known nitrite content, prepared from the standard nitrite solution. The corrected absorbencies of these solutions are put out against the micrograms nitrite. In the given measuring area the graph should be straight.

Place any waste in the container-

Calculation

Calculate the nitrite content with the following formula

$$\rho(NO_2^-) = \frac{b}{V_0}$$

in which

$\rho(NO_2^-)$ is the nitrite content in mg/L

b is the amount of NO_2^- , that according to the calibration graph corresponds with the corrected absorbance $\rho(NO_2^-)$ in µg

V_o is the volume of the sample solution, in mL

Use the following table to express the nitrite content in mmol/L or mg/L nitrogen

	mg NO_2^-	mmol NO_2^-	mg N_2
1 mg NO_2^-	1	0.022	0.30
1 mmol NO_2^-	46	1	14
1 mg N_2	3.29	0.071	1

Round of the result, with the use of the following table

Chloride content, mg/L	Round of on mg/L
0.025 - 0.1	0.005
0.1	0.01