DETERMINATION OF ZINC IN WATER BY FLUORIMETRIC METHOD

INTRODUCTION

In accordance with WHO's Guidelines for Drinking Water Quality there is no health-based guideline value of zinc in water concentration. Concentration of zinc in tap water can increase as a result of it's dissolution from pipes. Also elevated levels of zinc may be an indicator of increased concentrations of other toxic metals; thereby zinc in water analysis is an essential analytical task.
Lumex Instruments provides sensitive and selective fluorimetric method for the measurement of mass concentration of zinc in water samples using the FLUORAT-02 analyzer.

MEASUREMENT RANGE

Measurement range, mg/L	Directives & standards for drinking water	MAC (MPL), mg/L
0.005–2 (5 – 2000 ppb) (natural, drinking, and waste water)	WHO Guidelines for drinking water quality (2011)	4*
	FAO Water quality for agriculture (1985)	2
	US EPA National Secondary Drinking Water Regulations	5
	IS 10500:2012 Drinking water – Specification	5 / 15
	Resolução CONAMA No 396/2008	5

* A taste threshold concentration.

Samples with higher zinc content should be diluted prior to analysis.
The method can be applied to almost any type of water: natural, drinking, and waste water.

METHOD

The fluorimetric method for the determination of zinc is based on the complex formation of zinc ions with quinoline-8-thiol in the acetic buffer solution (pH = 4.6–4.9) in presence of 1,10-phenantroline as masking agents for iron. To remove the copper interference, 8,8'-diquinolyldisulfide is used. The complex of zinc ions is extracted with chloroform. The intensity of fluorescence of the formed complex is measured by the FLUORAT-02 analyzer and displayed as zinc concentration in mg/L. The result appears on the PC-operated FLUORATE software.
For natural and waste water preliminary decomposition of organic substances is performed by wet ashing. For drinking water no decomposition required.

HIGHLIGHTS OF THE FLUORIMETRIC METHOD

- Affordable price for instrument and reagents
- Detection limit is lower compared with conventional photometric techniques
- Wide measurement range enabling measuring both low concentrations in natural water and heavily contaminated samples
- High selectivity – measurement can be performed in the presence of iron, copper and other ions.

EQUIPMENT AND REAGENTS

- FLUORAT-02 analyzer with FLUORATE software
- Lumex Instruments optical filters*
- RM of zinc in water (1 g/L)*
- Sodium 8-quinolinethiolate (CAS 2801-16-3), p.a.*
- 8,8-Diquinolyl disulfide (CAS 29141-64-8), p.a.*
- 1,10-Phenanthroline, p.a.*
- Bidistilled or deionized water (grade 1; ISO 3696)
- Chloroform, puriss.
- Ethanol, p.a.
- Acetic acid, p.a.
- Ascorbic acid, p.a.
- Ammonium hydroxide solution, p.a.
- Hydrogen peroxide, supra pur,
- Nitric acid, supra pur,
- Sodium acetate trihydrate, puriss.

*— included in Lumex Instruments "Zinc in water" set, order code **300002647**.

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