

DETERMINATION OF IONIC COMPOSITION OF WATER IN BREWING PROCESSES BY CAPILLARY ELECTROPHORESIS

INTRODUCTION

Determination of ionic composition of water is an important factor in brewing processes, as inorganic ions affect fermentation and, as a result, the taste of the finished product. Determination of ionic composition of water has been usually performed using ion chromatography (IC). In recent years, capillary electrophoresis (CE) has been shown to provide fast and reliable results for these measurements.

MEASURING METHOD

The capillary electrophoresis method for determination of inorganic ions' concentrations is based on differential migration and separation of ions (cations and anions) in the electric field due to different electrophoretic mobility. Identification and quantitative determination of the analyzed ions is performed by indirect detection by measuring the UV absorption.



CONCENTRATION RANGES

Ranges of measurable concentrations for analyzed cations and anions are presented in the table.

Anions	Measurement range, mg/L	Cations	Measurement range, mg/L
Nitrite	0.2–50	Ammonium	0.5–5000
Nitrate	0.2–50	Lithium	0.02–2.0
Hydrophosphate	0.2–50	Sodium	0.5–5000
Sulfate	0.5–200	Potassium	0.5–5000
Fluoride	0.1–25	Magnesium	0.25–2500
Chloride	0.5–200	Calcium	0.5–5000
		Strontium	0.5–50.0
		Barium	0.05–5.0

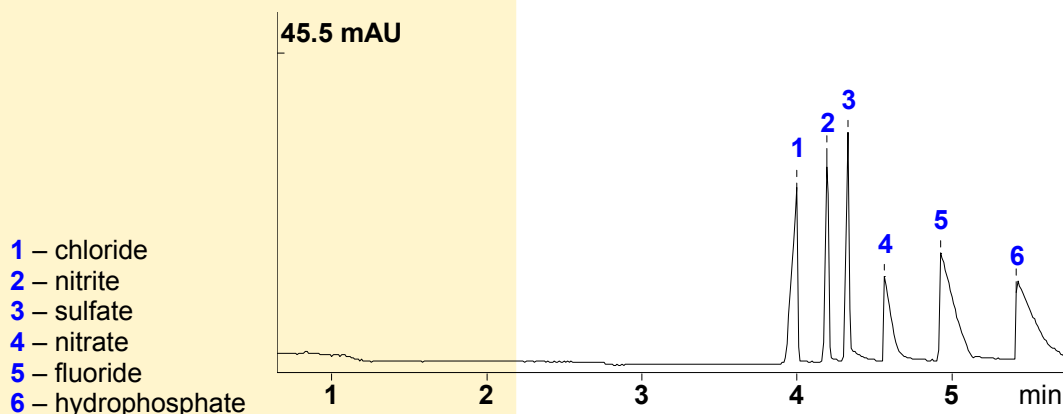
If the mass concentration of an ion in an analyzed sample exceeds the upper limit of the measurement range, it is allowed to dilute the sample.

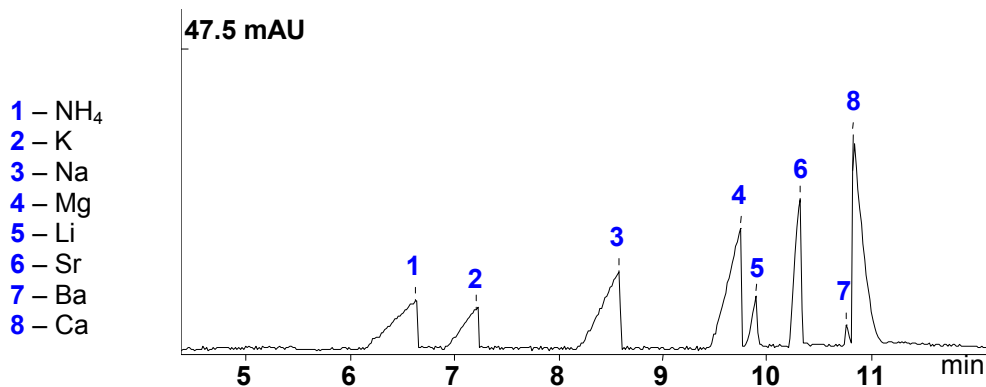
ADVANTAGES OF CAPILLARY ELECTROPHORESIS

Compared with ion determination in beer samples by IC method, capillary electrophoresis has several advantages:

- Low analysis cost
- Absence of an expensive chromatographic column
- Short analysis time

EXAMPLE OF REAL ANALYSIS





Other beer components, which can be determined by capillary electrophoresis method are as follows:

- Organic acids (formic acid, acetic acid, and others),
- Hop and beer bitter acids (humulones and isohumulones),
- Amino acids,
- Vitamins (B group, ascorbic acid),
- Amines (histamine, volatile alkyl amines),
- Preservatives and coloring agents in finished products

This application note contains only basic reference data. To obtain a more detailed information please contact Lumex Ltd. at Moskovsky prospect 19, Saint-Petersburg, 190005, Russia. Tel +7 812 718-5390 Fax +7 812 316-6538. E-mail: lumex@lumex.ru, <http://www.lumex.ru>