

DETERMINATION OF INORGANIC CATIONS AND ANIONS IN VODKAS

INTRODUCTION

The method allows determination of inorganic cations (ammonium, sodium, potassium, magnesium, calcium, and strontium) and inorganic anions (chloride, nitrite, sulphate, nitrate, fluoride, and phosphate ions) in samples of vodkas by capillary electrophoresis.

MEASURING METHOD

The capillary electrophoresis method for determination of inorganic cation (anion) concentrations is based on differential migration and separation of cations (anions) in an electric field due to their different electrophoretic mobility. Identification and quantitation of the analysed cations (anions) is performed by indirect detection by measuring the UV absorption at 254 nm wavelength.



CONCENTRATION RANGES

Ranges of measurable concentrations of analyzed ions are presented in Table below.

Cations	Measurement range, mg/l	Anions	Measurement range, mg/l
Ammonium	0.1 – 20.0	Fluoride	0.1 – 20.0
Sodium	0.1 – 50.0	Chloride	0.1 – 100.0
Potassium	0.1 – 20.0	Nitrite	0.1 – 20.0
Magnesium	0.1 – 20.0	Nitrate	0.1 – 20.0
Calcium	0.1 – 20.0	Phosphate	0.1 – 20.0
Strontium	0.1 – 20.0	Sulphate	0.1 – 100.0
Barium	0.1 – 20.0		

ADVANTAGES OF THE METHOD

Capillary electrophoresis has several advantages in comparison with the ion chromatography for determination of ions in vodkas:

- Low cost of analysis
- Very fast analysis of cation (anion) content of the sample
- Fast system switching from anion to cation analyses
- No sorbents, expensive chromatographic columns and their replacement are needed
- Low reagent consumption

EQUIPMENT AND REAGENTS

The following equipment and reagents are used in measurements:

- The CAPEL[®] Capillary Electrophoresis System
- Reference anion (cation) content standard solutions
- Distilled water
- Other reagents, full list is supplied with the method

Data acquisition, processing and output are performed using a personal computer running under WINDOWS[®] 95/98/ME/NT/2000/XP operating system with installed Chrom&Spec[®] for WINDOWS[®] software package for acquisition and processing of chromatography data.

PREOPERATIONAL PROCEDURES

Preoperational procedures include: sampling and sample preparation, capillary conditioning, preparation of auxiliary and calibration solutions, and calibration of the CAPEL[®] Capillary Electrophoresis System. Sampling is made in accordance with the standard certified protocol. The volume of the sample should be at least 100 ml.

The system is calibrated by measuring the signals of calibration solutions. Stability of the calibration characteristics is checked directly before sample

measurement by recording an electrophoregram of one of the calibration mixtures.

MEASUREMENT PROCEDURE

No less than two specimens should be analyzed for each sample queued.

DATA PROCESSING

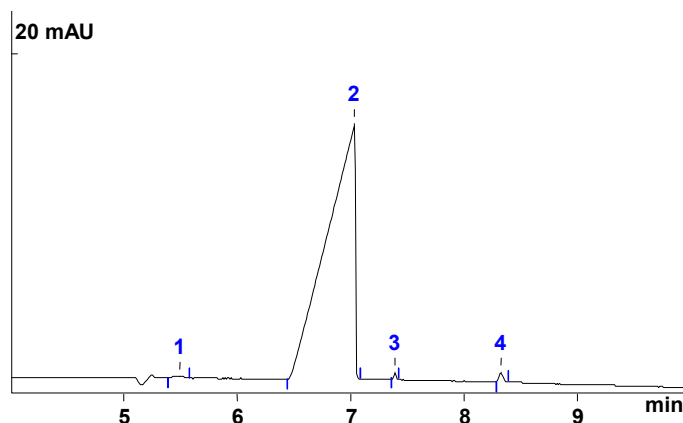
Chrom&Spec[®] for WINDOWS[®] software reports the mass concentrations (in mg/l) of analyzed ions in the analyzed solution.

EXAMPLE OF A REAL ANALYSIS

Sample: "Flagman" vodka

Results of the measurement:

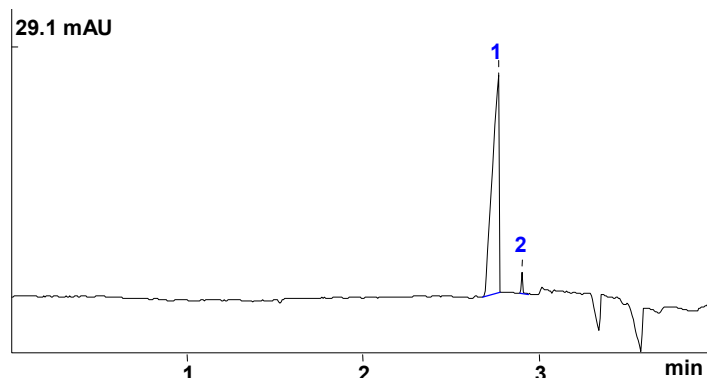
- 1 – Potassium (0.23 mg/l)
- 2 – Sodium (50 mg/l)
- 3 – Magnesium (< 0.1 mg/l)
- 4 – Calcium (0.21 mg/l)



Sample: "Flagman" vodka

Results of the measurement:

- 1 – Chloride (70 mg/l)
- 2 – Nitrate (1.8 mg/l)



This application note contains only basic reference data. To obtain a more detailed information please contact Lumex Ltd. at Moskovsky pr. 19, St.Petersburg, 190005, Russia. Tel +7 812 718-5390 Fax +7 812 316-6538.
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