



## 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 as hydrophosphate) in samples of vodkas by capillary electrophoresis.

### MEASUREMENT 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.

### MEASUREMENT RANGE

Cations	Measurement range, mg/L	Anions	Measurement range, mg/L
Ammonium	0.1–100	Fluoride	0.1–20
Sodium		Chloride	0.1–100
Potassium		Nitrite	0.1–20
Magnesium		Nitrate	0.1–20
Calcium		Phosphate (as hydrophosphate)	0.1–20
Strontium		Sulphate	0.1–100
Barium			

### EQUIPMENT AND REAGENTS

The "CAPEL" capillary electrophoresis system with high-voltage negative and positive polarity is used in measurements.

Data acquisition, collection, processing and output are performed using a personal computer running under "WINDOWS® 2000/XP" operating system with installed dedicated software package for acquisition and processing of chromatography data.

All reagents must be of analytical grade or higher.

### EXAMPLES OF REAL ANALYSES

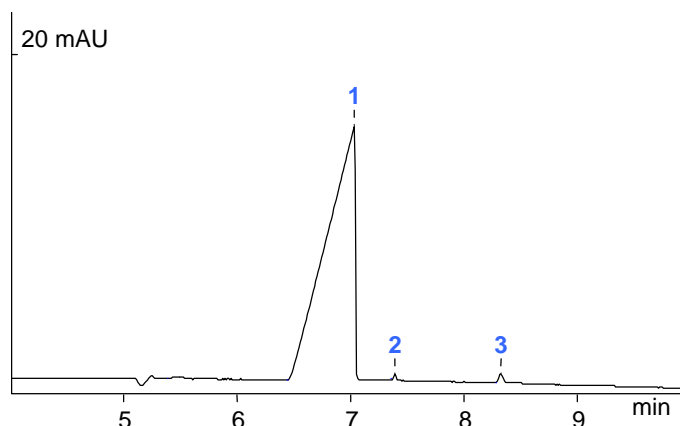
#### Cations content

**Buffer:** for cation determination  
**Capillary:**  $L_{EFF}/L_{TOTAL}$  50/60 cm, ID 75  $\mu$ m  
**Injection:** 300 mbar x sec  
**Voltage:** + 13 kV  
**Detection:** 254 nm, indirect

**Sample:** "Flagman" vodka

#### Results of the measurement:

- 1 – sodium (50 mg/L)
- 2 – magnesium (< 0.1 mg/L)
- 3 – calcium (0.21 mg/L)





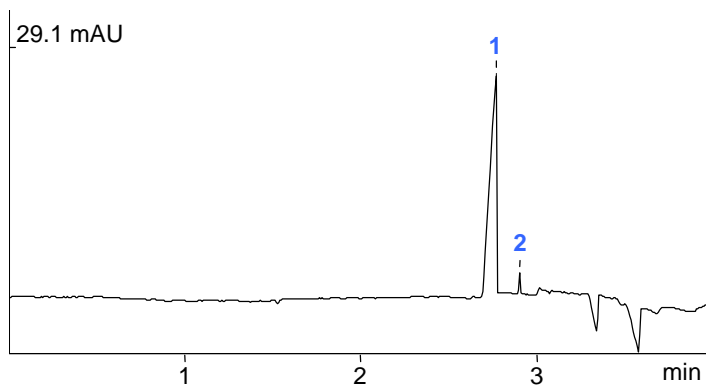
**Anions content**

**Buffer:** for anion determination  
**Capillary:**  $L_{EFF}/L_{TOTAL}$  50/60 cm, ID 75  $\mu$ m  
**Injection:** 300 mbar x sec  
**Voltage:** -17 kV  
**Detection:** 254 nm, indirect

**Sample:** "Flagman" vodka

**Results of the measurement:**

**1** – chloride (70 mg/L)  
**2** – nitrate (1.8 mg/L)



**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

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