



## DETERMINATION OF WATER-SOLUBLE FORMS OF INORGANIC CATIONS IN SOILS, CLAYS, PEAT, WASTEWATER SILT, ACTIVATED SLUDGE, AND BOTTOM SEDIMENTS

LUMEX Method M 03-08-2011

### INTRODUCTION

The content of water-soluble forms of inorganic cations (ammonium, potassium, calcium, sodium, magnesium) is one of the substantial characteristics in agrochemical, land reclamation, and sanitary assessments of soils (arable, hayland, pasturable, forest nursery soils). The cation balance should be controlled during ecological soil monitoring for the human activity impact assessment.

### MEASUREMENT METHOD

The measurement method is based on the extraction of water-soluble forms of cations with distilled water from a soil sample and subsequent separation, identification, and determination of analyzed components by the capillary electrophoresis method with indirect detection at wavelength of 254 or 267 nm.

### MEASUREMENT RANGE

The measurement ranges for inorganic cations are listed below.

Cations	Measurement ranges*, mg/kg
Ammonium	2–20000
Calcium	2–10000
Magnesium	1–10000
Potassium	2–20000
Sodium	2–20000

\* for a sample of 2.5-5 g

The determination of these ions is not hindered by the presence of Ba, Li, Sr, Mn, Fe (II), Rb, Cs cations in the concentrations that are typical for this type of samples.

### EQUIPMENT AND REAGENTS

The CAPEL® capillary electrophoresis system is used in measurements. Data acquisition, collection, processing and output are performed using a personal computer running under WINDOWS® XP/7/8 operating system with installed dedicated software package ELFORUN®. All reagents must be of analytical grade or better.

### EXAMPLES OF REAL ANALYSES

**BGE:** benzimidazole, with tartaric acid and 18-crown-6

**Capillary:**  $L_{\text{eff}}/L_{\text{tot}}$  50/60 cm,  
ID 75  $\mu\text{m}$

**Injection:** 300 mbar x sec

**Voltage:** +25 kV

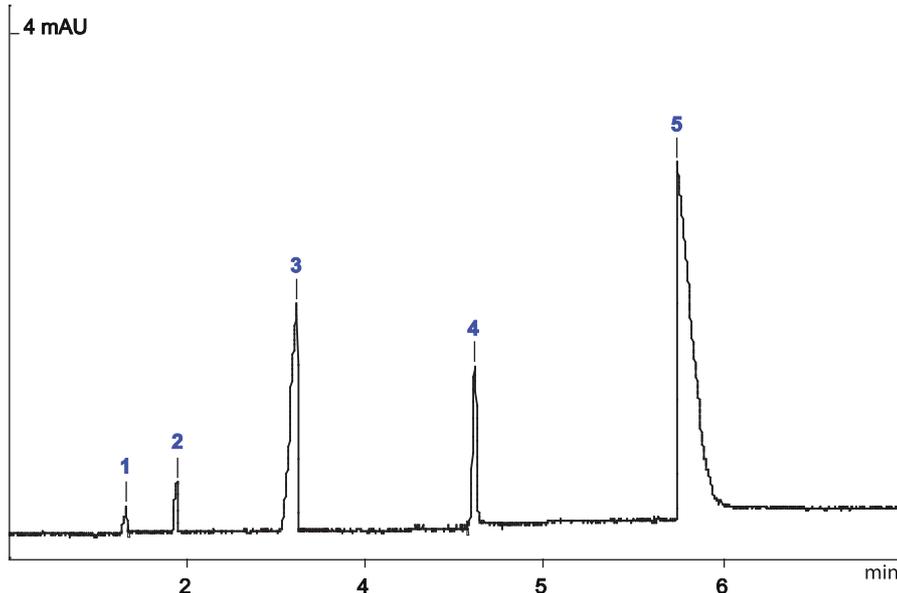
**Temperature:** RT

**Detection:** 267 nm, indirect

**Sample:** soil (water extract)

### Measurement results, mg/kg:

- 1 – ammonium (1.7)
- 2 – potassium (10.3)
- 3 – sodium (51)
- 4 – magnesium (8.5)
- 5 – calcium (93)

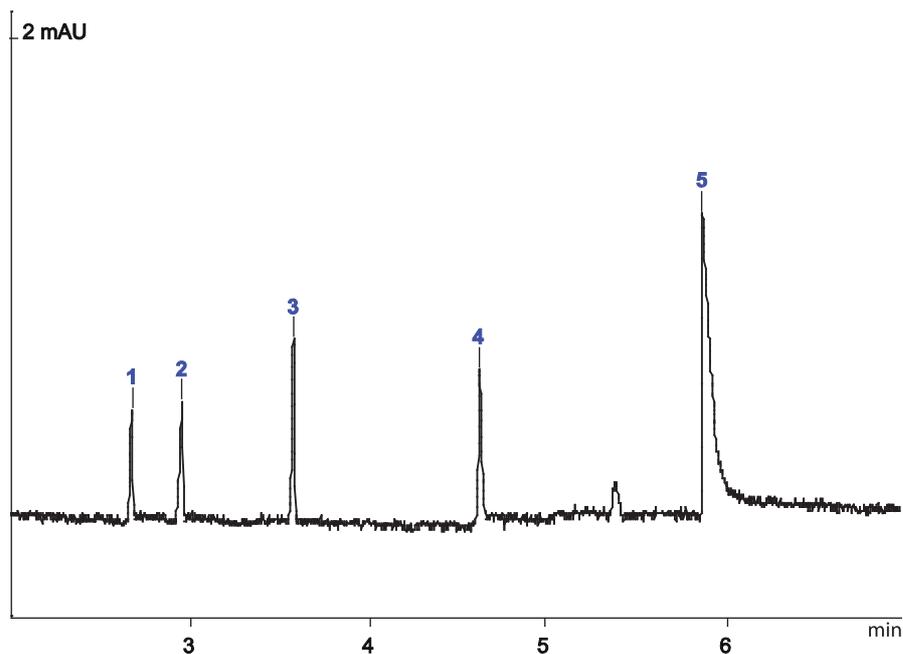




**Sample:** sod-podzolic loamy soil (water extract)

**Measurement results, mg/kg:**

- 1 – ammonium (7.3)
- 2 – potassium (10.6)
- 3 – sodium (5.4)
- 4 – magnesium (7.2)
- 5 – calcium (33)



The information in this leaflet is supplemental. To get more specific, please contact the manufacturer of CAPEL® CE systems LUMEX INSTRUMENTS Group.

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