



Determination of **cations** in fertilizers

INTRODUCTION

The method is used for the determination of the mass concentration of water-soluble and total content of cations: ammonium (including ammonium nitrogen), potassium (including potassium oxide), sodium (including sodium oxide), magnesium (including magnesium oxide) and calcium (including calcium oxide) in samples of **inorganic, organo-mineral, organic fertilizers and fertilizer raw materials** by capillary electrophoresis.



MEASUREMENT METHOD

The measurement method is based on the extraction from a sample by distilled water (for water-soluble forms) or by hydrochloric acid solution (for total content) and subsequent separation, identification, and determination of cations by capillary electrophoresis with indirect UV detection at wavelength of 254 nm.

MEASUREMENT RANGE

The measurement ranges for the components are presented in the table below.

Compound	Measurement range, %	Compound	Measurement range, %
Ammonium	0.010–35.0	Ammonium nitrogen (N)	0.008–27.3
Potassium	0.010–55.0	Potassium oxide (K ₂ O)	0.012–66.3
Sodium	0.010–40.0	Sodium oxide (Na ₂ O)	0.014–53.9
Magnesium	0.010–25.0	Magnesium oxide (MgO)	0.016–41.5
Calcium	0.010–40.0	Calcium oxide (CaO)	0.014–56.1

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® operating system with Elforun software installed. Lumex Instruments set, order **No. 0300004779**.

EXAMPLES OF REAL ANALYSES

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

Capillary: L_{eff}/L_{tot} 50/60 cm, ID 75 µm

Sample: organo-mineral fertilizer, *total content*

Found (%):

- 1 – ammonium nitrogen (N) (2.2)
- 2 – sodium oxide (Na₂O) (0.23)
- 3 – magnesium oxide (MgO) (0.46)
- 4 – calcium oxide (CaO) (1.25)

