



VILLA LABECO s.r.o.  
Chrapčiakova 1  
052 01 Spišská Nová Ves

## ISOTACHOPHORESIS

### APPLICATION NOTE No. 9

## DETERMINATION of ALKALINE METALS and ALKALINE EARTH METALS

#### MAIN FEATURES:

Alkaline metals and alkaline earth metals are the group very hardly separated ions. There were found conditions for simultaneously determination of them in one analysis. To achieve sufficient differences in ion mobility which are decisive for effective separation in electrophoresis, the PEG was added to leading electrolyte for creating complexation balance between separated ions and PEG. This procedure is possible to utilize for determination these ions in water (drinking, waste, surface), drinks, extraction of plant material, urine, blood, etc.

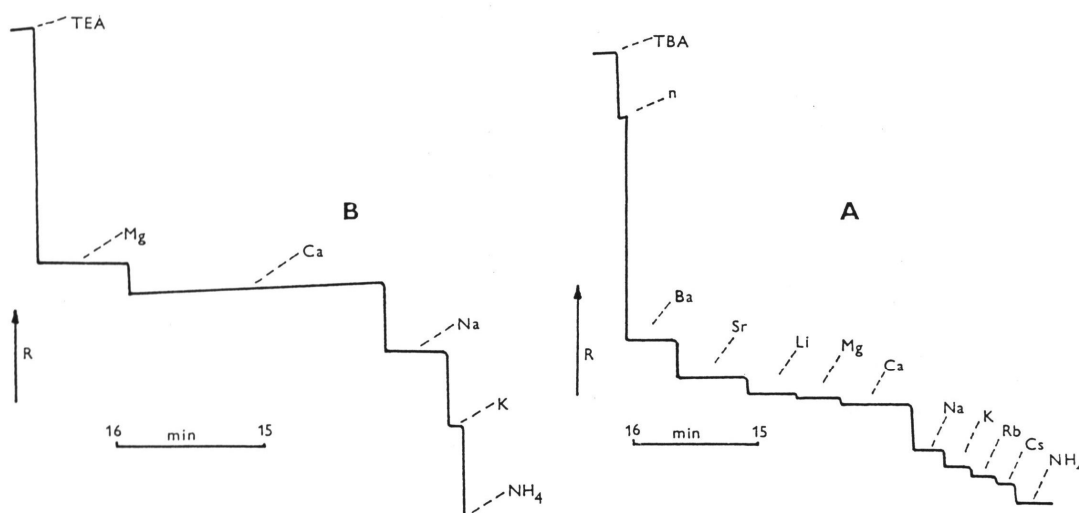


Fig. 1 : Isotachophoreograms of analysis from analytical column :

A – model mixture (concentration cca  $5 \cdot 10^{-5}$  mol/l)

B – analysis of drinking water diluted 1:4 (determined concentration in mg/l: K=4,5; Na=8; Ca=67; Mg=15)

Conditions : leading electrolyte (LE):  
 $10^{-2}$  M  $\text{NH}_4$  + acetic acid, pH=5; dissolution :  $\text{H}_2\text{O}$  : PEG 55 : 45 /vol. + 0,2% HEC

terminating electrolyte (TE):  
 $3 \cdot 10^{-2}$  M  $\text{TBAClO}_4$ , dissolution :  $\text{H}_2\text{O}$  resp. /B/  $3 \cdot 10^{-3}$  M  $\text{TEAClO}_4$ , dissolution :  $\text{H}_2\text{O}$

$I_1 = 250 \mu\text{A}$ ,  $I_2 = 50 \mu\text{A}$ ,  $V=30 \mu\text{l}$

Detection limit is in the range of tens and hundreds of ppb. It is possible to increase it by repeated dosing of the sample by means of injection valve. This procedure enables to increase dosing volume and to decrease detection limit.

Reproducibility of the result is 1-2% rel.

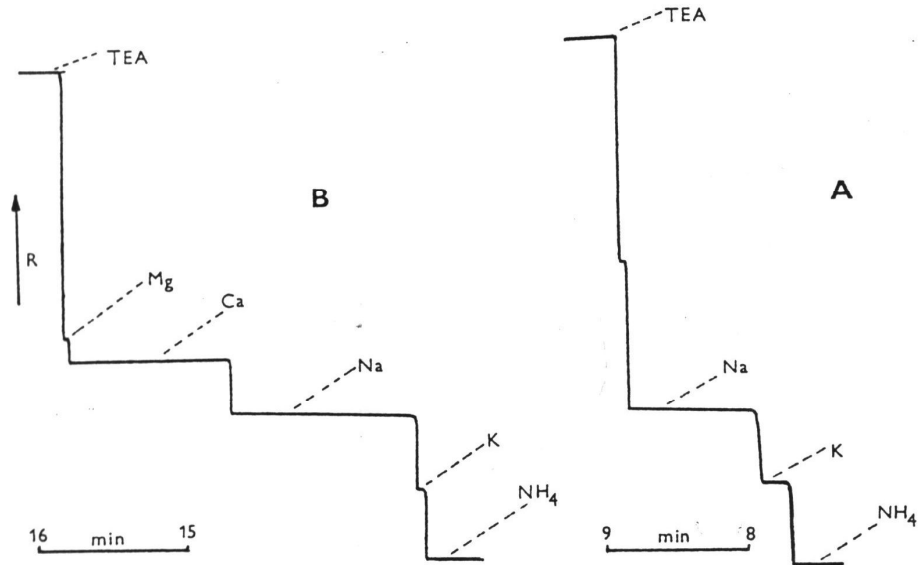


Fig. 1 : Isotachophoreogram of urine analysis :

A – preparation column : evaluated macrocomponents  
B – analytical column : evaluated microcomponents:

Conditions : as in Fig.1., sample was diluted 1 : 100 by deionized water  
Determined concentrations (mg/l) : K=1240; Na=1280; Ca=660; Mg=25

Literature:

1. D.Kaniansky, I. Zelenský, I. Valášková, J.Marák, V.Zelenská , Isotachophoretic separation of alkali and alkaline earth metal cation in water-polyethylene glycol mixtures, J.Chromatogr., 502/1990/, 142

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**Villa Labeco s.r.o., Chrapčiakova 1, 052 01 Spišská Nová Ves, Slovakia**  
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