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ISOTACHOPORESIS

APPLICATION NOTE No. 1

ANALYSIS of DRINKING and SURFACE WATER

MAIN FEATURES:

Isotachophoresis was applied to identify and quantify simultaneously the most frequently determined macrocomponents (Cl, SO₄, NO₃/ and microcomponents /NO₂, F, PO₄/ in water. It is possible to determine another ionogenic components. Precision and accuracy of results are better than classical methods.

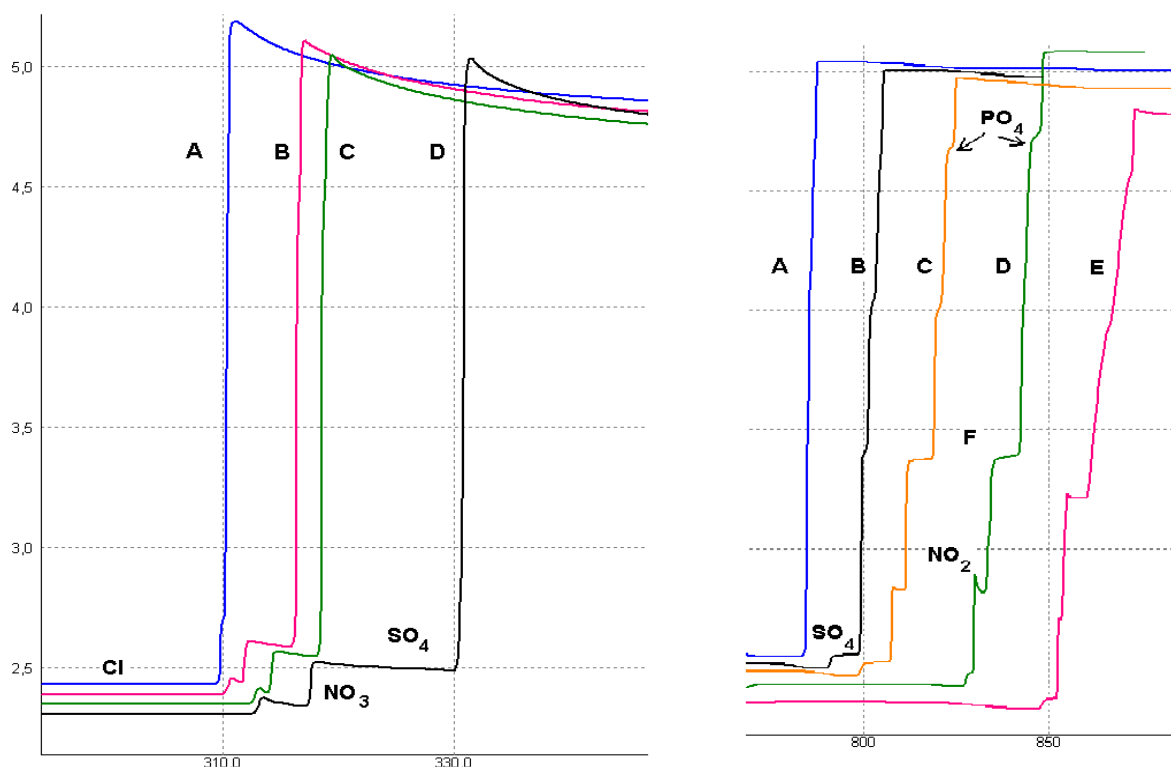


Fig. 1 : Isotachophoreograms of water analysis

Left - macrocomponents in preseparation column $I_1 = 250 \mu A$, A – blanc, B,C – drinking water, D – model mixture of **10 ppm** NO₃, SO₄

Right – microcomponents in analytical column $I_2 = 7.5 \mu A$, A – blanc, B – drinking water, C,D – model mixture of **0.2 ppm** NO₂, F, PO₄, E – river Hornád water

Conditions : leading electrolyte (LE):
preseparation column : $8 \cdot 10^{-3}$ M Cl + $3 \cdot 10^{-3}$ M BISTRIS propane + $1.5 \cdot 10^{-3}$ M β -alanine
+ 0.1% hydroxyethylcellulose /HEC/, pH=3.7
analytical column : $2 \cdot 10^{-3}$ M Cl + $1.5 \cdot 10^{-3}$ M β -alanine+ 0.1% HEC, pH=3.5
terminating electrolyte (TE): $5 \cdot 10^{-3}$ M citric acid, V=30 μl

Reproducibility and accuracy comparison of the classical and ITP methods are shown in Table 1 – sample : Danube water. The classical methods were done from two labs and ITP method was done from four labs. The methods of calibration curve and standard addition were used in both cases. Sixteen measurements were evaluated from each component. The results are calculated for 95% reliability interval.

Tab.1

	classical (mg/l)	ITP (mg/l)
Cl	44,28 +/- 3,56	42,66 +/- 2,45
NO ₃	41,13 +/- 7,79	39,20 +/- 2,04
SO ₄	94,16 +/- 22,51	94,35 +/- 1,84
NO ₂	0,71 +/- 0,40	0,95 +/- 0,08
F	-	0,156 +/- 0,007
PO ₄	1,02 +/- 1,48	0,974 +/- 0,206

For accuracy comparison model samples were analysed by classical and ITP methods in two labs. Results are shown in Table 2.

Tab.2

	Cl		NO ₃		SO ₄	
	1.lab.	2.lab.	1.lab.	2. lab	1.lab.	2. lab
známe	50,0	-	40,0	-	25,0	-
ITP	50,66	52,01	40,4	39,0	24,64	24,02
klasicky	51,4	49,9	43,0	38,5	28,10	31,1

	NO ₂		F		PO ₄	
	1.lab.	2.lab.	1.lab.	2. lab	1.lab.	2. lab
známe	1,0	-	0,1	-	2,0	-
ITP	1,084	1,075	0,106	0,110	1,99	2,06
klasicky	1,38	3,8	-	-	0,1	2,2

Literature:

1. I.Zelenský, V. Madajová, D. Kaniánsky, P. Havaši, V. Lednárová : Determination of inorganic anions in water by column-coupling capillary isotachophoresis, J.Chromatography, 294/1984/317

The CZE and ITP analysers are produces by :

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