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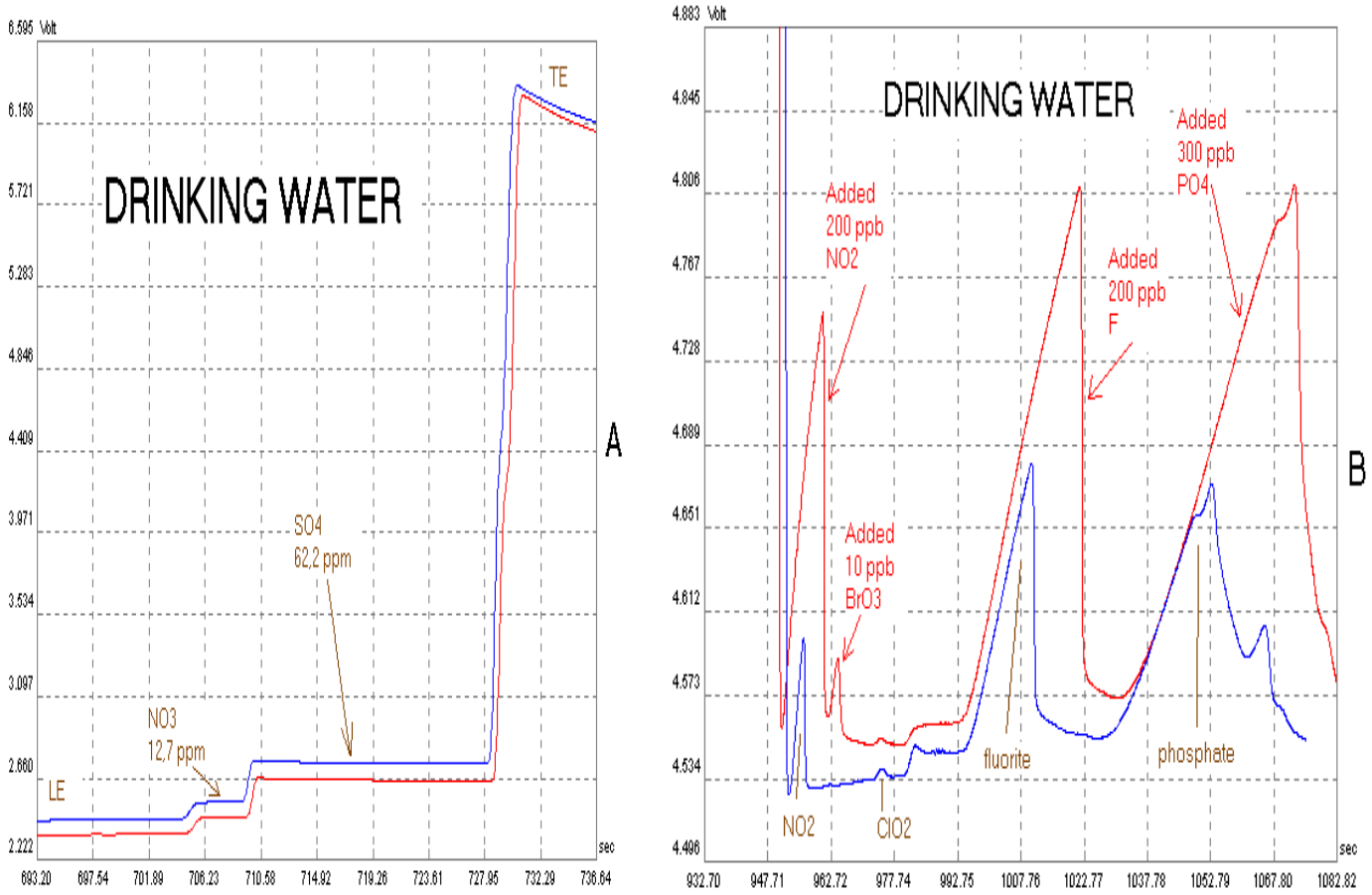
I T P - C Z E

APPLICATION NOTE No.27

ANALYSIS OF ANIONS IN WATER
drinking, surface, mineral

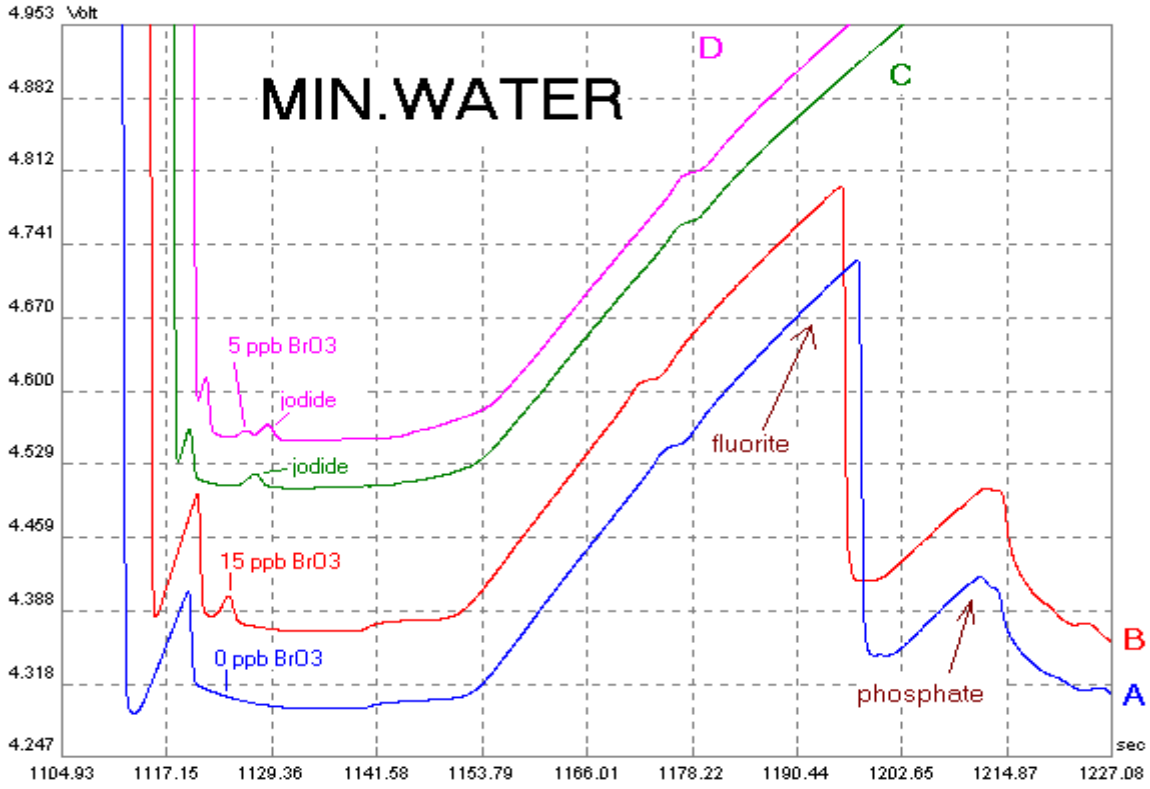
FEATURES:

Electrophoretic methods enables to simultaneous analysis of following anions **NO_3, SO_4, NO_2, BrO_3, J, ClO_2, F, PO_4**. Principle of the method is the isotachophoretic separation and evaluation of the macroconstituents (NO_3, SO_4) in the preseparation column. Another microcontituents are concentrated during ITP analysis (some of them even 10^5 times), and separated and evaluated in the second – analytical column by capillary zone electrophoresis (CZE) Time of the analysis is ca 15 min and for mineral water ca 22 min. Accurasy and reproducibility is better than for the classical methods and is comparable or better than IC method. Detection limits are on ppb level (**BrO_3 - 1 ppb**). The cost of the analysis is ca 10 – 100 times lower than in IC .Beside filtration **no sample pretreatement is necessary.** Method is suitable also for the most of waste water samples.



Obr. 1. A - ITP analysis of macroconstituensts in drinking water
B – CZE analysis of microconstituents in drinking water

Conditions: leading electrolyte: 8 mM Cl + 3 mM BISTRIS propane + 1,5 mM β-alanine + 0,1%MHEC, pH = 3,7
terminating electrolyte: 5 mM succinic acid + β-alanine , pH = 3,6
BGE: 10 mM succinic acid + 15 mM β-alanine + 0,1% MHEC, pH = 3,6
I_1 = 250 μA, I_2 = 50 μA, l_1 = 160 (200) mm, l_2 = 220 mm, V = 30 μl



Obr. 2. ITP-CZE analysis of mineral waters before and after addition of BrO3
A,B - budišská (SK), B,C - hanácka (CZ) with natural content of jodide

Results

Tab.1. Characteristics of the method

Parameter (peak area)	**$HBrO_3$**	**$HClO_2$**
Linearity [µg/l]	0-50	0-200
Reproducibility (n=6) [%]	3,7 (25 ppb)	4,2 (100 ppb)
Recovery[%]	95,3 (25 ppb)	80,7 (100 ppb)
Detection limit [µg/l]	1	4

Literature: 1. Bodor R., et.al., Determination bromate in drinking water by ITP-CZE, Advences and Aplications of Chromatography in Industry, Abstract of Symposium, Bratislava, 2001.
2. F. Kvasnička, D. Rousová, J. Manda, L. Kollerová and V. Janda: Determination of Inorganic Oxohalides in Drinking Water – Comparison of Ion Chromatography with On-Line Coupled Capillary Isotachophoresis – Zone Electrophoresis, The 5th Balaton Symposium on High-performance separation methods, Siofok, Hungary, 3.-5.09.2003.