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ISOTACHOPHORESIS

APPLICATION NOTE No. 3

DETERMINATION of THIODIACETIC ACID in URINE

MAIN FEATURES:

Thiodiacetic acid is one of the metabolites of carcinogenic vinyl chloride. A direct correlation has been established between the amount of thiodiacetic acid in urine and the exposure of the organism. At present, mostly GS-method is used for this purpose. But this method is laborious and time-consuming because extraction and derivation steps are needed.

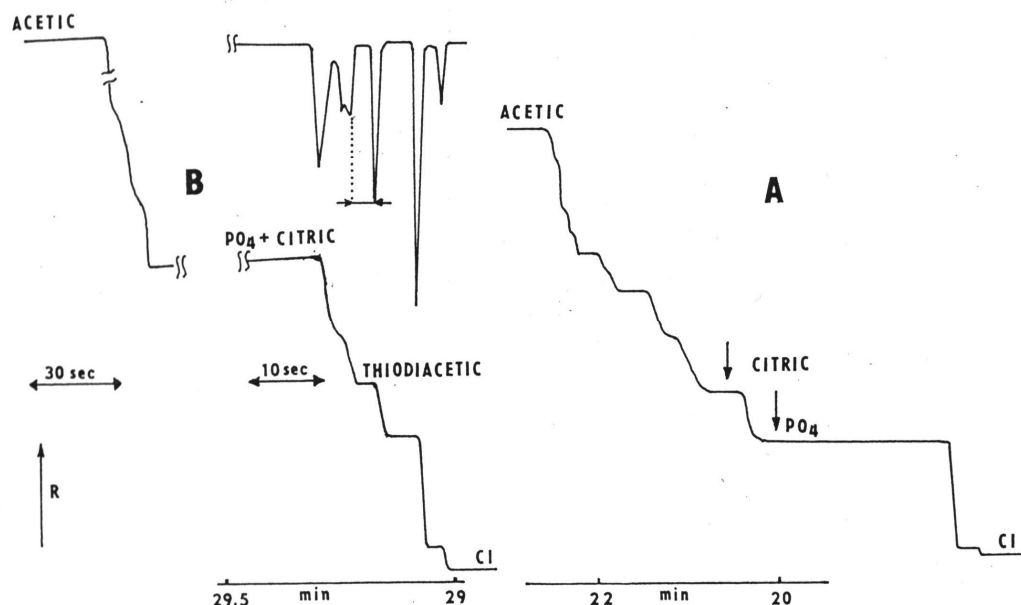


Fig. 1 : Isotachophoreograms of urine from person to vinyl chloride :

A – record from preseparation column / $I_1 = 200 \mu A$ /

B – record from analytical column (only part between arrows was analysed, $I_2 = 50 \mu A$ /

Determined concentration: $9,2 \cdot 10^{-5} \text{ mol/l}$ / ca $0,46 \text{ nmol/l}$ /

Conditions : leading electrolyte (LE):
Preseparation column : $10^{-2} \text{ M Cl} + \beta\text{-alanine} + 0,2\% \text{ hydroxypropylcellulose/HPC}$, pH=3,4

Analytical column : $10^{-2} \text{ M Cl} + \beta\text{-alanine} + 0,2\% \text{ HPC}$, pH=4,3

terminating electrolyte (TE): $5 \cdot 10^{-2} \text{ M acetic acid}$, $V=5 \mu l$ /urine/

It is possible to determine by ITP the content of thiodiacetic acid in urine without any pre-treatment of the sample. The method is fast and simple. Detection limit was $6 \cdot 10^{-6}$ mol/l and reproducibility was 3% rel. It was found that the concentration for non-exposed persons of TDA in urine is in the range :0,026 – 0,068 nmol/l and for exposed persons is in the range : 0,076 – 0,15 nmol/l.

Literature:

1. L.Křivánková, E.Samcová, P.Boček : Determination of thiodiacetic acid in urine of people exposed to vinyl chloride by analytical capillary isotachophoresis, Electrophoresis, 1984,5,226
2. L.Křivánková, P.Boček, E.Samcová : Pracovní lékařství, 36, 1984, 5, 163

CZE and ITP analysers are produced by :
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