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ISOTACHOPHORESIS

APPLICATION NOTE No. 13

DETERMINATION of BENZOIC ACID in FOOD

MAIN FEATURES:

Benzoic acid is often used as a preservative in food products. Isotachophoresis was applied to identify and to quantify it simultaneously. The method proposed is characterized by high precision accuracy and simple sample pre-treatment (extraction and filtration). The method was used for determination of benzoic acid in ketchup, jam, marmalade, mustard, etc. If the matrix of the sample is simple, it is possible to used only one electrolyte system in both columns. In the case of the sample with a rather complicated matrix, it is recommended to use two different electrolyte systems for each columns to avoid interferences. It is possible to analyse another organic acid (formic, citric, malic) simulteneously.

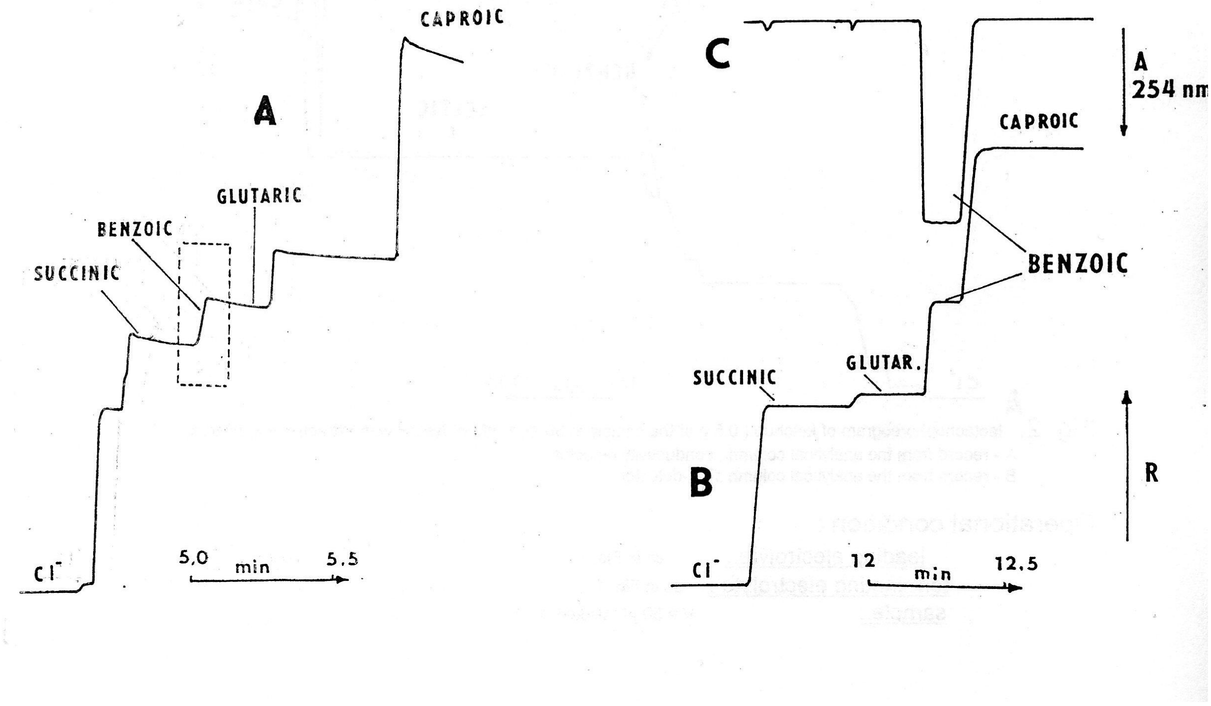

Fig. 1 : Isotachophoreogram of musterd (0,5 g of the sample was extracted in 50 ml 1mM NaOH, filtered and diluted 1 : 1.)

A – record from the preseparation column : conductivity detector
B – record from the analytical column : conductivity detector
C – record from the analytical column : UV-detector
Only the part in the box was analyzed in the analytical column

Conditions :

leading electrolyte (LE):
preseparation column : 10^{-2} M Cl +β-alanine + 0,1MHEC , pH=3,9
analytical column : 10^{-2} M Cl + ε-aminocaproic acid + 0,1%MHEC , pH=5,0
terminating electrolyte (TE): 5.10^{-3} M caproic acid
V=30 μl, sample was diluted 1:1 by adding spacer (glutamic and succimic acid) in concentration 2.10^{-4} M

Principle of the method :

Two spacers are added to the sample (one of them has higher and the other lower mobility than benzoic acid). Then we obtain very narrow mobility interval in which benzoic acid and other interference substituents are migrating. By appropriate programming of the analyser we are able to insure that only the constituent between spacers is migrating to the analytical column. In the analytical column is the electrolyte with different pH, thus mobilities change and the separation of non-separed constituents from preseparation column is achieved.

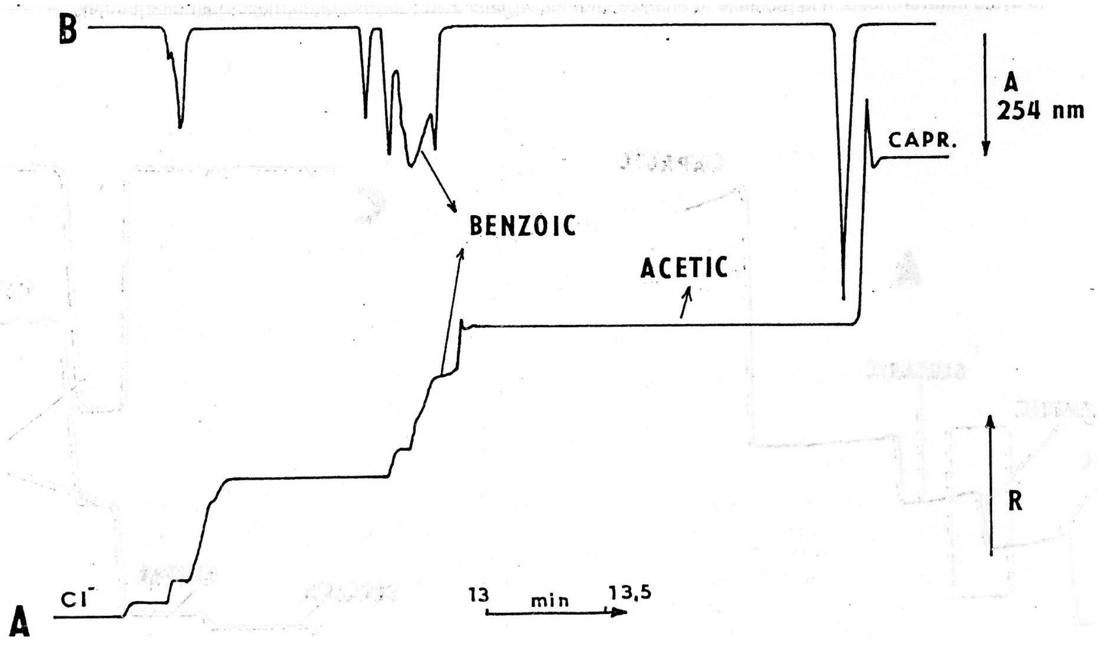

Fig. 2 : Isotachophoreogram of ketchup (0,5 g of the sample in 50 ml 1mM NaOH was extracted and filtered)
A – record from the analytical column : conductivity detector
B – record from the analytical column : UV-detector

Conditions :

leading electrolyte (LE): as in Fig.1
terminating electrolyte (TE): as in Fig.1
sample : V=30 μl, diluted 1:1

Literature :
Madajova V., Marák J., Kaniansky D., ŠDimuničová E., Chemické listy 86, 381-385, 1992