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ISOTACHOPHORESIS

APPLICATION NOTE No. 17

DETERMINATION of CITRIC and ISOCITRIC ACIDS in JUICES

MAIN FEATURES:

Content proportion of citric and isocitric acid is one of watched parameters during forgery disclosure of lime-juices. Capillary ITP enables elegant determination of these acids in one analysis practically without sample pre-treatment.

For separation of citric and DL-isocitric acid which have very near mobility during all pH interval suitable for ITP techniques (from 2,5 to 10) it is used complex creation of citric acid with calcareous ions. DL-isocitric acid creates much weaker complex with Ca ions and therefore its mobility is less effected. After adding Ca ions into leading electrolyte the effective mobility of citric acid is so decreased that it is possible both acids to separate each other. At the same conditions it is possible to determine malic acid as well.

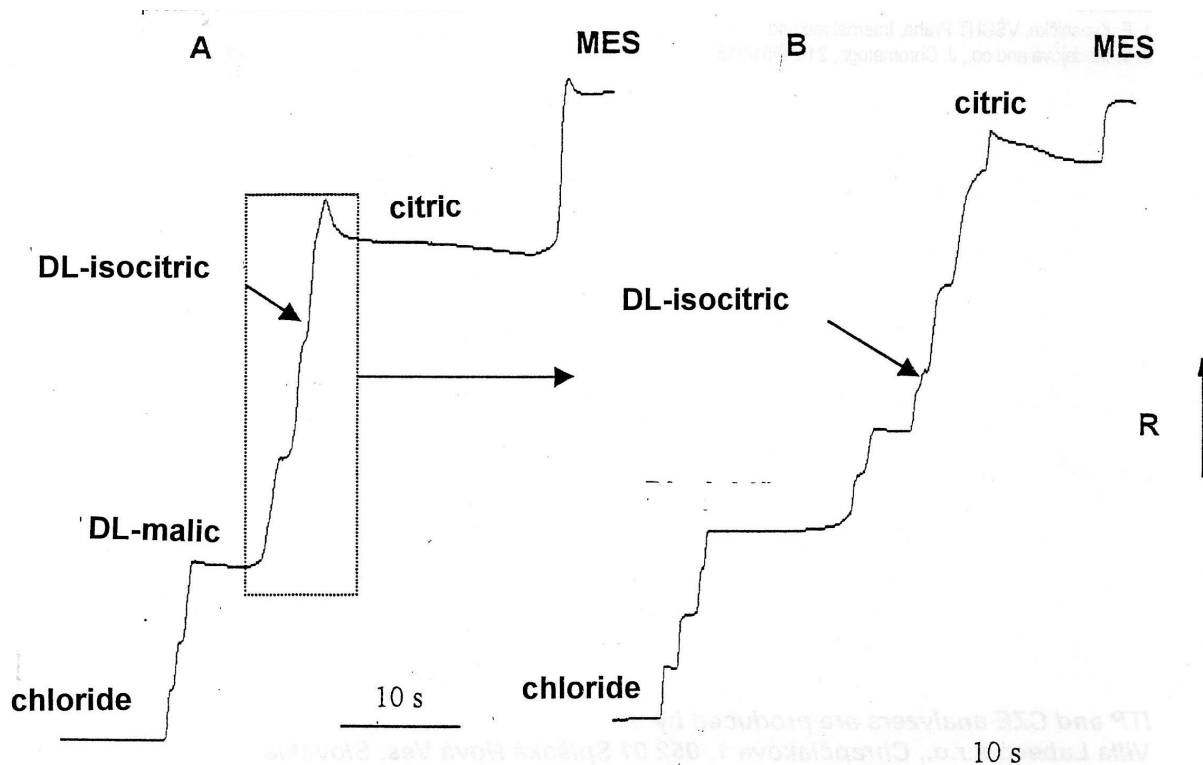


Fig. 1 : ITP records of lime-juice sample. Sample was diluted 50-times.

A – record from pre-separation column 0,8/90mm

B – record from analytical column 0,3/90mm

R – signal from conductivity detector

Conditions :

leading electrolyte (LE): 6mM HCl + 3,8mM BTP + 2mM CaCl + 0,05% hydroxypropylcellulose

terminating electrolyte (TE): 5mM MES + 1mM BTP

V=10 µl by microsyringe, $I_1 = 250 \mu\text{A}$, $I_2 = 50 \mu\text{A}$ and during detection decreased to 25 µA

Time of analysis : 15-20 sec.

Sample treatment :

Into 50 ml volumetric flask there are pipetted 2 ml of juice sample and volumetric flask is fulfilled up to mark by demineralized water. After mixing and filtrating via paper filter the filtrate is directly analysed.

Results :

Reproducibility of method (in real sample all steps 6-times repeated) expressed as standard deviation is for citric acid 1,1% (at concentration level 9 g/l) and for DL-isocitric acid 2,3% (at concentration level 110 mg/l)

Yielding of citric acid was 96-103% (at concentration level 2 or 8 g/l) and for DL-isocitric acid was 89-94% (at concentration level of 10 or 40 mg/l).

Detection limit for citric acid in preseparation column is 8 ng (for 25-times dilution of sample is 0,05g/l) and for DL-isocitric acid is 2ng (for 25-times dilution of sample is 1,5 mg/l)

Literature :

1. F. Kvasnička, VŠCHT Praha, Internal method
2. V. Maďajová and co., J. Chromatogr., 216/198/313

CZE and ITP analysers are produced by :

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