



DETERMINATION OF ORGANIC ACIDS IN BEVERAGES

INTRODUCTION

The method allows determination of organic acids, in soft drinks (juices, fizz drinks) and alcoholic drinks (dry wines, beer).

MEASURING METHOD

The method is based on differential migration and separation of anions of organic acids in electric field due to their different electrophoretic mobility. Identification and quantitative determination of the analyzed components are performed by detecting the optical density of a solution at 254 nm wavelength (operational wavelength for CAPEL[®] system).



CONCENTRATION RANGES

Ranges of measurable concentrations for analyzed organic acids are presented in the table.

Acids	Measurement range, mg/l	Linear range, mg/l
Tartaric acid	1.0 – 5000	1.0 – 50
Citric acid	1.0 – 10000	1.0 – 50
Lactic acid	1.0 – 5000	1.0 – 50
Formic acid	1.0 – 500	1.0 – 30
Acetic acid	1.0 – 5000	1.0 – 50
Oxalic acid	1.0 – 500	1.0 – 50
Malic acid	1.0 – 5000	1.0 – 50
Succinic acid	1.0 – 2000	1.0 – 50

Inorganic anions (chloride, nitrite, sulphate, nitrate, fluoride, carbonate), ascorbic acid, and preservatives (benzoic and sorbic acids) do not influence the determination of analyzed organic acids.

ADVANTAGES OF CAPILLARY ELECTROPHORESIS

Compared with determination of organic acids in beverages by HPLC method, capillary electrophoresis has several advantages:

- Low analysis cost
- Absence of an expensive chromatographic column
- Short analysis time

EXAMPLE OF REAL ANALYSIS

CE system: The CAPEL[®] CE System with high-voltage negative polarity

Buffer: for organic acids' determination

Capillary: L_{EFF}/L_{TOTAL} 50/60 cm, ID 75 μ m

Injection: hydrodynamic

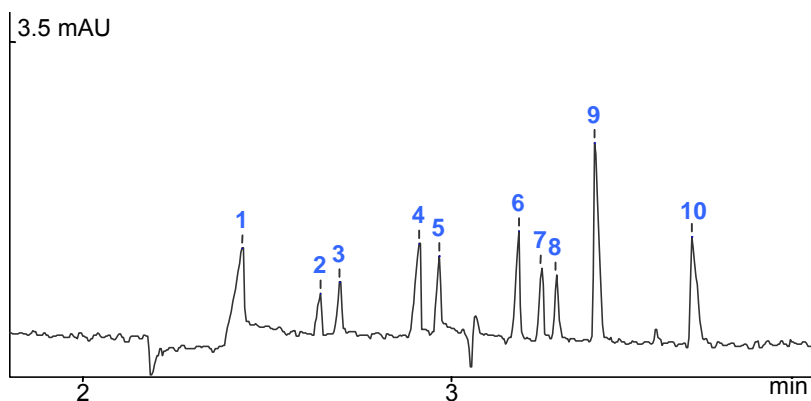
Voltage: –20 kV

Detection: 254 nm, indirect



Sample: test solution of organic acids and phosphate (10 mg/l of each acid):

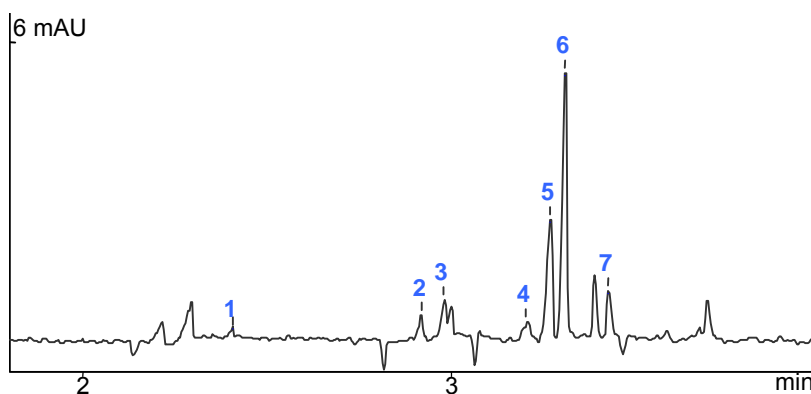
- 1 – oxalic acid
- 2 – formic acid
- 3 – tartaric acid
- 4 – malic acid
- 5 – citric acid
- 6 – succinic acid
- 7 – lactic acid
- 8 – phosphate
- 9 – acetic acid
- 10 – propionic acid



Sample: dark beer, diluted 1:20

Measurement results:

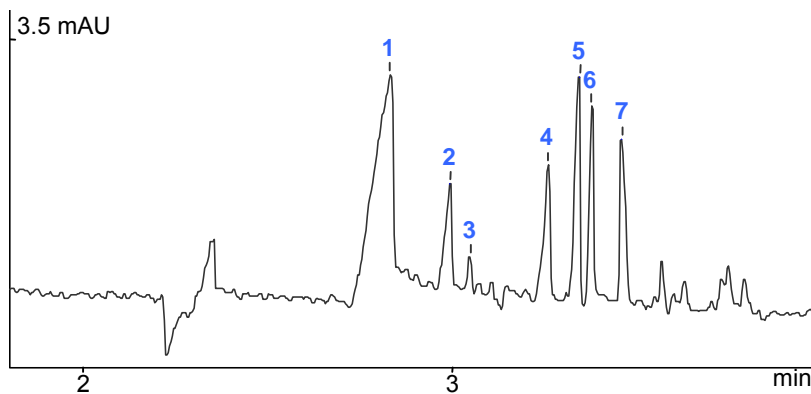
- 1 – oxalic acid (9.8 mg/l)
- 2 – malic acid (82.3 mg/l)
- 3 – citric acid (148 mg/l)
- 4 – succinic acid (46.2 mg/l)
- 5 – lactic acid (67 mg/l)
- 6 – phosphate
- 7 – acetic acid (107 mg/l)



Sample: dry white wine, diluted 1:50

Measurement results:

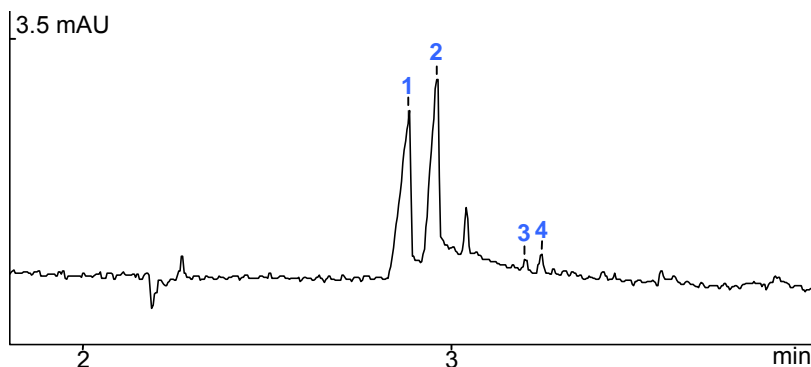
- 1 – tartaric acid (1415 mg/l)
- 2 – malic acid (1643 mg/l)
- 3 – citric acid (465 mg/l)
- 4 – succinic acid (500 mg/l)
- 5 – lactic acid (1165 mg/l)
- 6 – phosphate
- 7 – acetic acid (405 mg/l)



Sample: cherry juice, diluted 1:100

Measurement results:

- 1 – malic acid (2725 mg/l)
- 2 – citric acid (3054 mg/l)
- 3 – lactic acid (112 mg/l)
- 4 – phosphate



The contents on this paper are subject to change without notice.