ANALYSIS OF **ORGANIC ACIDS** IN BEER BY CAPILLARY ELECTROPHORESIS

INTRODUCTION

Determination of organic acids is important at all stages of beer production, especially in control of fermentation processes and correlation of their concentrations with the taste of the finished product. Traditionally, organic ion composition of aqueous solutions is determined by ion chromatography (IC) and HPLC. Capillary electrophoresis represents new, fast, and reliable method for simultaneous analysis of organic acids in brewing processes.

MEASUREMENT METHOD

The capillary electrophoresis method for determination of organic anions' concentrations is based on differential migration and separation of anions in the electric field due to different electrophoretic mobility. Identification and quantitative determination of the analyzed ions is performed by indirect detection by measuring the UV absorption.

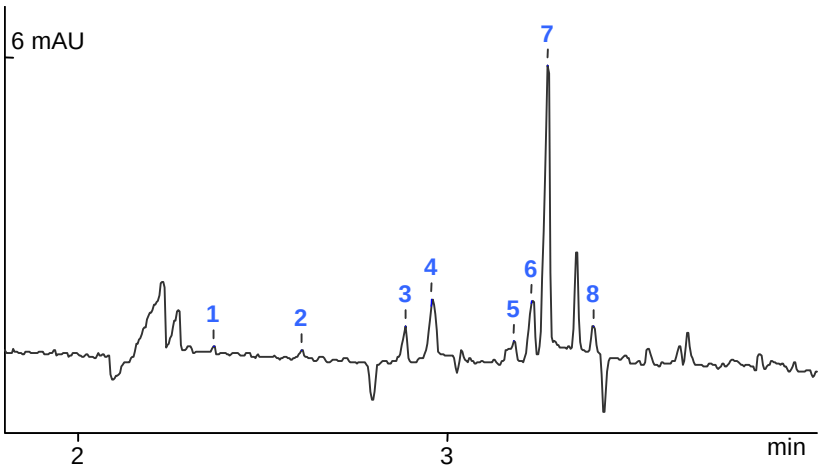
MEASUREMENT RANGE

Capillary electrophoresis with indirect detection can be used for analysis of such organic acids as malic, succinic, citric, formic, acetic, lactic, and others.
Concentration range is usually **1–300 mg/L**.

EXAMPLE OF A REAL ANALYSIS

Buffer: benzoic acid, with DEA, CTAB, and disodium EDTA
Capillary: L_{EFF}/L_{TOTAL} 50/60 cm, ID 75 µm
Injection: 150 mbar x sec
Voltage: – 20 kV
Detection: 254 nm, indirect

Sample: dark beer, diluted 1:19
Measurement results:
1 – oxalic acid (1.1 mg/L)
2 – formic acid (17 mg/L)
3 – malic acid (85 mg/L)
4 – citric acid (227 mg/L)
5 – succinic acid (93 mg/L)
6 – lactic acid (255 mg/L)
7 – phosphate (as hydrophosphate)
8 – acetic acid (39 mg/L)



Other beer components, which can be determined by capillary electrophoresis method are as follows:

- Cations and anions of water in brewing processes;
- Vitamins (B complex, ascorbic acid);
- Amino acids;
- Hop and beer bitter acids;
- Amines;
- Preservatives and coloring agents in finished products.

ADVANTAGES OF CAPILLARY ELECTROPHORESIS

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

- high separation efficiency;
- low analysis cost;
- absence of an expensive chromatographic column;
- short analysis time.

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