DETERMINATION OF CAFFEINE, ASCORBIC ACID, PRESERVATIVES (BENZOIC ACID, SORBIC ACID AND THEIR SALTS), AND ARTIFICIAL SWEETENERS (ACESULFAME K, SACCHARINE) IN SOFT AND STRONG DRINKS

LUMEX Method M-04-51 (2008)

INTRODUCTION

The method is used for measuring the concentrations of caffeine, ascorbic acid, preservatives (sorbic and benzoic acids and their salts) and sweeteners (acesulfame K, saccharin and its salts) in soft and alcoholic drinks.

MEASUREMENT METHOD

The micellar electrokinetic chromatography (MEKC) allows separation of neutral and ionic forms of analyzed components.
The components are detected by intrinsic absorption at a wavelength of 254 nm.

MEASUREMENT RANGE

Measurement ranges of analyzed components are presented in the table below.

Compound	Samples	Measurement range*, mg/L	Detedted as
Caffeine	Juices, soft drinks, wines	10–1000	Caffeine
Sorbic acid (E 200) Sodium sorbate (E 201) Potassium sorbate (E 202) Calcium sorbate (E 203)			Sorbic acid
Benzoic acid (E 210) Sodium benzoate (E 211) Potassium benzoate (E 212) Calcium benzoate (E 213)			Benzoic acid
Ascorbic acid (E 300) Sodium ascorbate (E 301) Calcium ascorbate (E 302) Potassium ascorbate (E 303)			Ascorbic acid
Acesulfame K (E 950)			Acesulfame K
Saccharin, sodium saccharin, potassium saccharin, calcium saccharin (E 954)			Sodium saccharin

* *For any type of food additive*

The present method does not allow separation of such food additives as E200–E203, E210–E213, E300–E303, and E954.
Other sweeteners (aspartame, cyclamate) synthetic food dyes, vitamins B and vanillin do not hinder the analysis if added in concentrations, typical for the analysed drinks.

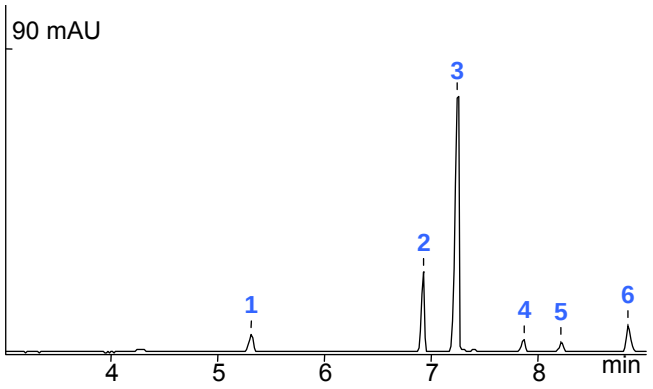
EQUIPMENT AND REAGENTS

The "CAPEL®" capillary electrophoresis system with high-voltage positive polarity is used in measurements.
Data acquisition, collection, processing and output are performed using a personal computer running under "WINDOWS® 2000/XP" operating system with installed dedicated software package for acquisition and processing of chromatography data.
All reagents must be of analytical grade or better.

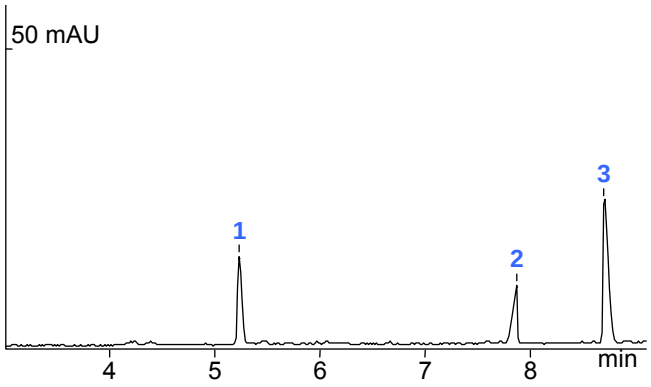
EXAMPLES OF REAL ANALYSES

Buffer: borate, with SDS
Capillary: L_{eff}/ L_{tot} 50/60 cm, ID 75 µm
Injection: 150 mbar x sec
Voltage: + 25 kV
Temperature: + 20 °C
Detection: 254 nm

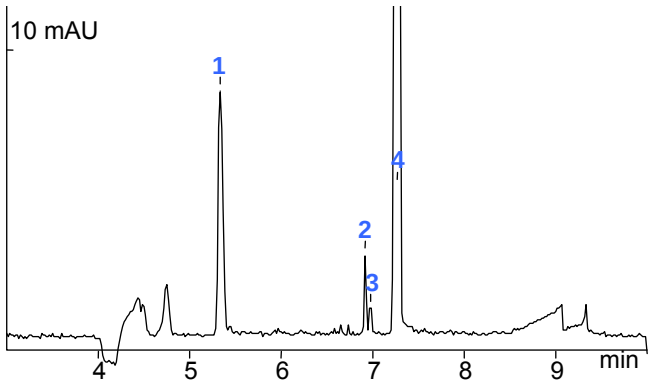
Sample: test mixture (30 mg/L of each compound)
1 – caffeine
2 – ascorbic acid
3 – sorbic acid
4 – benzoic acid
5 – sodium sacharin
6 – acesulfame K



Sample: soft drink, undiluted
Measurement results:
1 – caffeine (92 mg/L)
2 – benzoic acid (120 mg/L)
3 – acesulfame K (129 mg/L)



Sample: energy drink, fivefold diluted
Measurement results:
1 – caffeine (325 mg/L)
2 – ascorbic acid (22.8 mg/L)
3 – vanillin
4 – sorbic acid (220 mg/L)



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