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

Lumex Method M 04-51-2008

INTRODUCTION

The method[1] is used for the determination of the mass concentration of caffeine, ascorbic acid and its salts, sorbic acid and its salts, benzoic acid, and its salts, acesulfame K, saccharin and its salts in beverages.
The method can be applied for **all types of non-alcoholic and alcoholic beverages including sport and energetic drinks, juices, beer and beer products, wines, brandy and spirits, liquors, and vodka**.

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	CSFA code	E number	Determined form	Measurement range*, mg/L
Caffeine	–	–	Caffeine	**10–1000**
Sorbic acid Sodium sorbate Potassium sorbate Calcium sorbate	INS 200 INS 201 INS 202 INS 203	E 200 E 201 E 202 E 203	Sorbic acid	
Benzoic acid Sodium benzoate Potassium benzoate Calcium benzoate	INS 210 INS 211 INS 212 INS 213	E 210 E 211 E 212 E 213	Benzoic acid	
Ascorbic acid Sodium ascorbate Calcium ascorbate Potassium ascorbate	INS 300 INS 301 INS 302 INS 303	E 300 E 301 E 302 E 303	Ascorbic acid	
Acesulfame K	INS 950	E 950	Acesulfame K	
Saccharin Calcium saccharin Potassium saccharin Sodium saccharin	INS 954(i) INS 954(ii) INS 954(iii) INS 954(iv)	E 954(i) E 954(ii) E 954(iii) E 954(iv)	Sodium saccharin	

* *For every mentioned form of the food additive.*

The present method does not allow separation of such food additives as E 200 – E 203, E210 – E 213, E 300 – E 303, and E 954. Other sweeteners (aspartame, cyclamate) synthetic food dyes, vitamins B, and vanillin do not hinder the analysis if added in concentrations, typical for the analyzed drinks.

EQUIPMENT AND REAGENTS

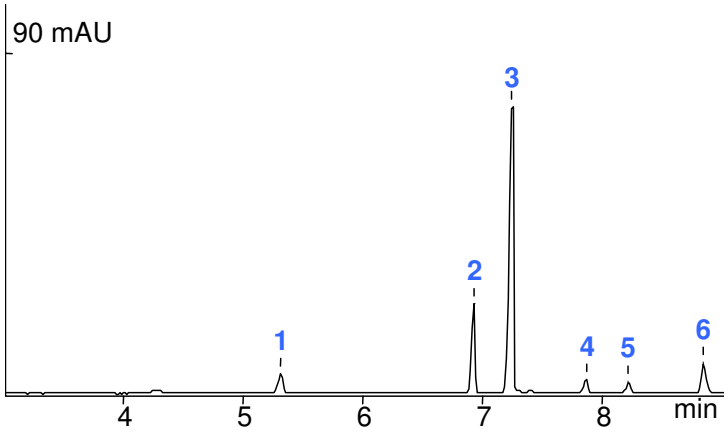
The CAPEL capillary electrophoresis system is used in measurements. Data acquisition, collection, processing and output are performed using a personal computer running under WINDOWS® XP/7/8/10 operating system with installed dedicated software package ELFORUN.
Lumex Instruments complex set, order No **0300002054**.

[1] – National Standard GOST R 53193-2008, SM GOST R 53193:2012 (Moldova).

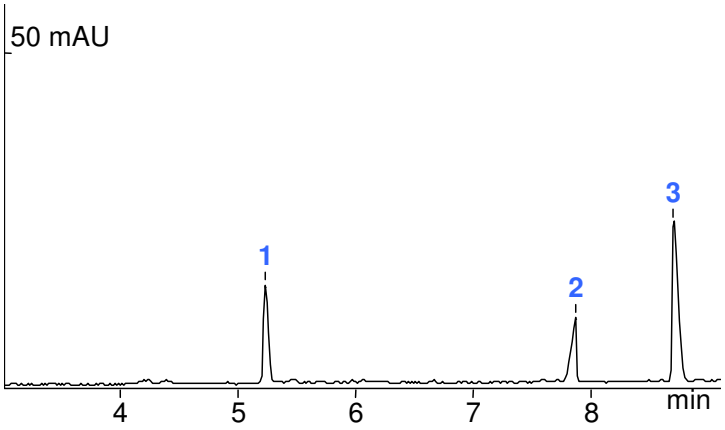
EXAMPLES OF REAL ANALYSES

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

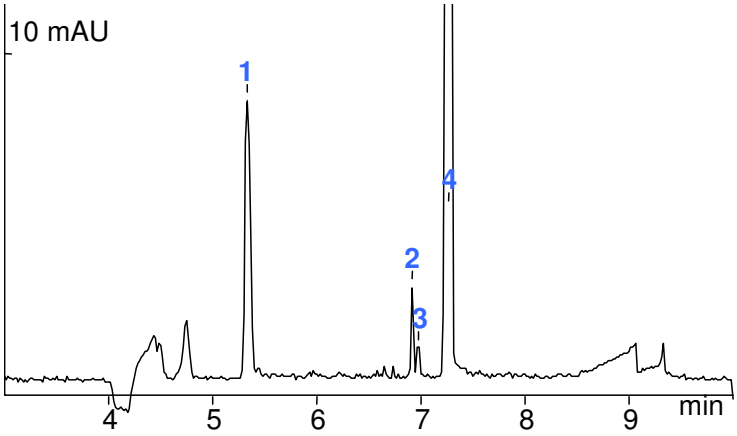
Sample: test mixture (30 mg/L of each compound)
1 – caffeine
2 – ascorbic acid
3 – sorbic acid
4 – benzoic acid
5 – sodium saccharin
6 – acesulfame K



Sample: soft drink, undiluted
Measurement results:
1 – caffeine (90 mg/L)
2 – benzoic acid (120 mg/L)
3 – acesulfame K (130 mg/L)



Sample: energy drink, fivefold diluted
Measurement results:
1 – caffeine (325 mg/L)
2 – ascorbic acid (20 mg/L)
3 – vanillin
4 – sorbic acid (220 mg/L)



The contents on this paper are subject to change without notice.
To get more specific information, please contact the representative by **sales@lumexinstruments.com**