DETERMINATION OF PRESERVATIVES (BENZOIC, SORBIC ACIDS, AND THEIR SALTS) AND SWEETENERS (ACESULFAME K, SACCHARINE, AND ITS SALTS) IN FOOD PRODUCTS AND RAW MATERIALS, AND DIETARY SUPPLEMENTS

Lumex Method M 04-59 (2009)

INTRODUCTION

Various food additives – preservatives (benzoic acid, sorbic acid, and their salts), sweeteners (Acesulfame K, saccharine and its salts) and others are widely used in food industry for the improvement of food products properties and extension of storage life. The amount of these additives in food products is regulated by technical instructions and other norms.

The method is used for measuring the concentrations of preservatives (sorbic and benzoic acids and their salts) and sweeteners (acesulfame K, saccharin and its salts) in **food products and raw materials, and dietary supplements**.

MEASUREMENT METHOD

The measurement method is based on extraction of the determined components from a sample with hot water, their separation and quantitative determination by capillary electrophoresis method with micellar electrokinetic chromatography. Detection of the determined components is performed in the UV spectrum range at 254nm wavelength.

MEASUREMENT RANGE

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

Compound	CSFA code	E number	Determined form	Measurement range*, mg/kg
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	**20–10 000**
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	
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 separation of different forms of the additives E200–E203, E210–E213, and E954 is not possible in the framework of the method.

Aspartame, cyclamate, sodium glutamate, synthetic dyes, vitamins of the B group, vitamin C, vanillin, caffeine, theobromine in the concentrations that are typical for the products of interest does not influence the determination of the components.

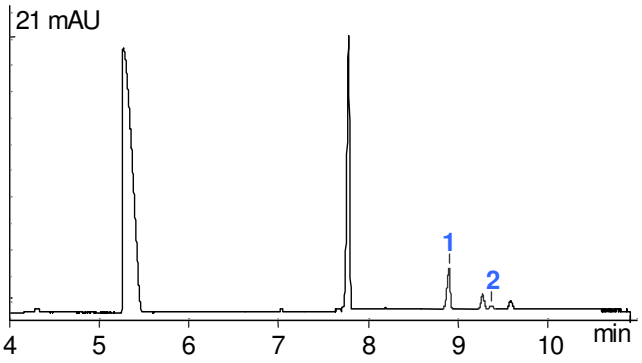
EQUIPMENT AND REAGENTS

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 operating system with installed dedicated software package ELFORUN®.

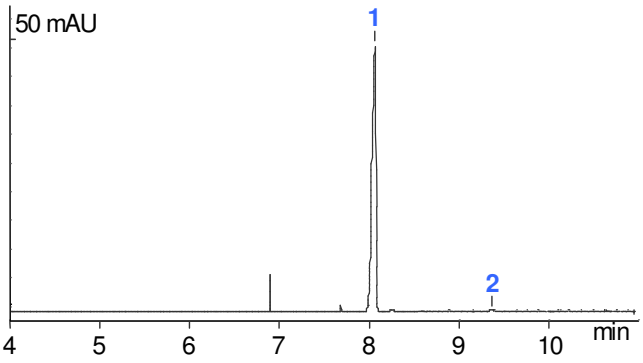
All reagents must be of analytical grade or better.

EXAMPLES OF REAL ANALYSES

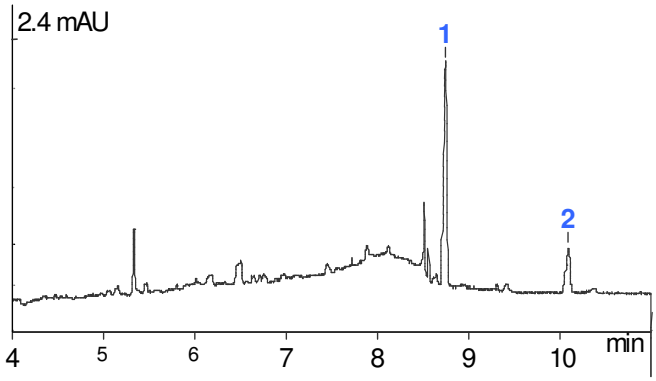
BGE:	borate, with SDS
Capillary:	L_{eff}/ L_{tot} 50/60 cm, ID 75 µm
Injection:	150 mbar x sec
Voltage:	+ 25 kV
Temperature:	+ 20 ^{O}C
Detection:	254 nm



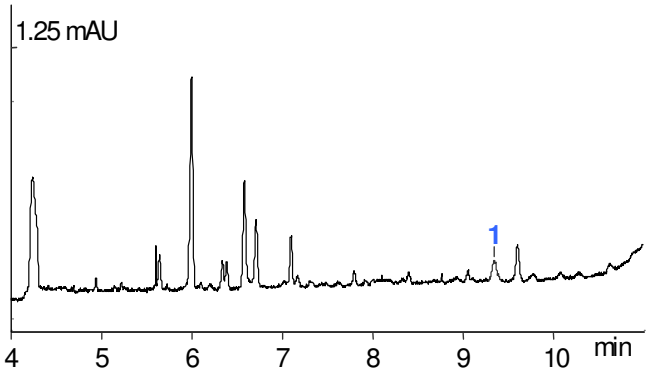
Sample: dietary supplement
Measurement results:
1 – benzoic acid (600 mg/kg)
2 – sodium saccharinate (80 mg/kg)



Sample: mayonnaise sauce
Measurement results:
1 – sorbic acid (725 mg/kg)
2 – sodium saccharinate (35 mg/kg)



Sample: Soya sauce
Measurement results:
1 – benzoic acid (440 mg/kg)
2 – acesulfame K (90 mg/kg)



Sample: canned beans
Measurement results:
1 – sodium saccharinate (30 mg/kg)