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.

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

* 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: \( L_{\text{ef}} \), \( L_{\text{tot}} \) 50/60 cm,
          ID 75 \( \mu \)m
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 saccharin
6 – acesulfame K

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

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)

The content of this application note is subject to change without notice.