



## DETERMINATION OF WATER-SOLUBLE VITAMINS IN BEER BY CAPILLARY ELECTROPHORESIS

### INTRODUCTION

Among all alcoholic beverages beer is an absolute leader in water-soluble vitamins content, especially vitamins of B complex. These vitamins both come from the starting materials, such as yeast and malt, and form during the brewing processes. Recently, vitamin supplementation to enhance nutritional value of beer became common in beer production. This makes methods of fast qualitative determination of soluble vitamins in beer an important task in quality control in its production. One of such methods is capillary electrophoresis technique.

### MEASUREMENT METHOD

The capillary electrophoresis method for evaluation of vitamin concentration is based on the migration and separation of these substances in the electric field due to their different electrophoretic mobility. Identification and quantitative evaluation of the analyzed components are performed by detecting the inherent UV absorption at a wavelength of 200 and 240 nm.

### MEASUREMENT RANGE

Vitamins	Measurement range, mg/L	Vitamins	Measurement range, mg/L
B <sub>1</sub> (thiamine chloride)	4.0–100	B <sub>6</sub> (pyridoxal)	3.0–100
B <sub>2</sub> (riboflavin)	4.0–100	B <sub>c</sub> (folic acid)	2.5–100
B <sub>3</sub> (pantothenic acid)	4.0–100	P (rutin)	2.0–100
B <sub>5</sub> (nicotinic acid)	2.0–100	P (quercetin)	2.0–100
B <sub>5</sub> (nicotinamide)	2.0–100	H (biotin)	3.0–100
B <sub>6</sub> (pyridoxine)	1.0–100	C (ascorbic acid)	8.0–150

### EQUIPMENT AND REAGENTS

The "CAPEL<sup>®</sup>-105/105M" capillary electrophoresis system with a special capillary cassette for the vitamins analysis is used in measurements.

Data acquisition, collection, processing and output are performed using a personal computer running under "WINDOWS<sup>®</sup> 2000/XP" operating system with installed dedicated software package for acquisition and processing of chromatography data.

All reagents must be of analytical grade or higher.

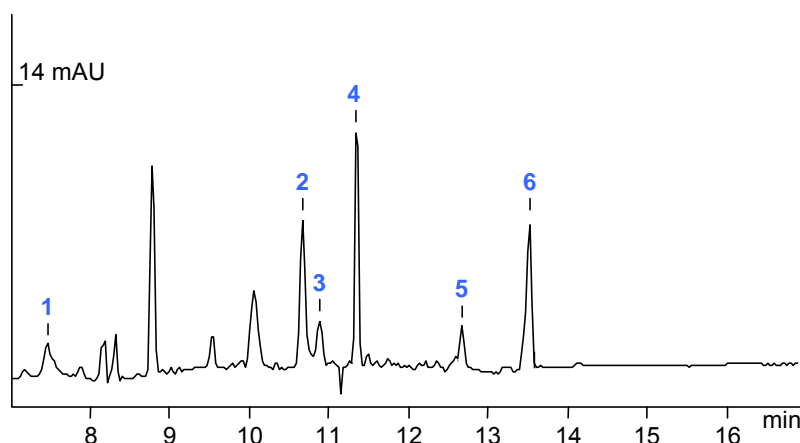
### EXAMPLE OF A REAL ANALYSIS

**Buffer :** borate, with SDS  
**Capillary:** L<sub>eff</sub>/L<sub>tot</sub> 65/75 cm; ID 50 µm  
**Injection:** 600 mbar x sec  
**Voltage:** + 25 kV  
**Pressure:** 0 mbar, 50 mbar  
**Temperature:** +30 °C  
**Detection:** 200, 240 nm

**Sample:** beer "X" (50 µL)

#### Measurement results:

- 1 – nicotinamide (21.1 mg/L)
- 2 – pyridoxal (9.7 mg/L)
- 3 – pyridoxine (2.7 mg/L)
- 4 – rutin (40 mg/L)
- 5 – ascorbic acid (21 mg/L)
- 6 – nicotinic acid (90 mg/L)



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