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.

MEASURING METHOD

The capillary electrophoresis method for evaluation of vitamin mass 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.

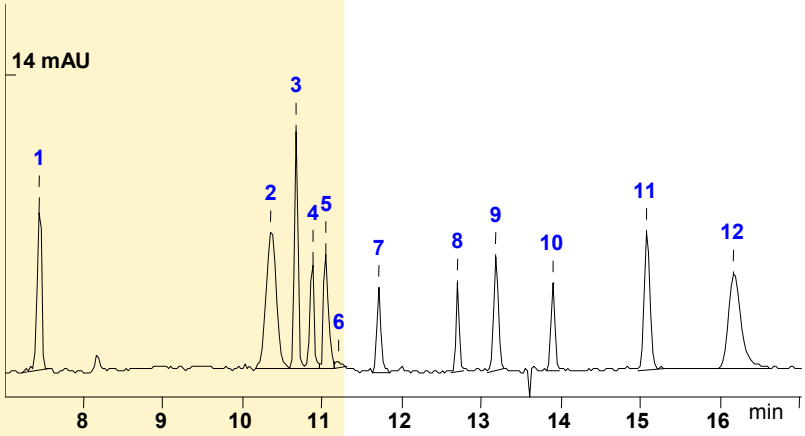
ADVANTAGES OF CAPILLARY ELECTROPHORESIS

Compared with vitamin determination in beer samples by HPLC systems, capillary electrophoresis has several advantages:

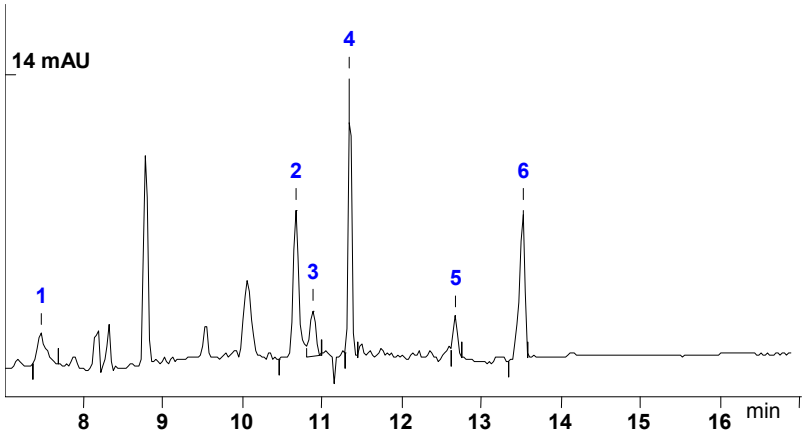
- Absence of derivatization
- Low analysis cost
- Absence of an expensive chromatographic column
- Short analysis time

EXAMPLES OF REAL ANALYSIS

Sample: standards
1 – nicotinamide (B5)
2 – pyridoxal (B6)
3 – pyridoxine (B6)
4 – biotin (H)
5 – vitamin B2
6 – quercetin (P)
7 – rutin (P)
8 – vitamin C
9 – vitamin B3
10 – nicotinic acid
11 – folic acid (Bc)
12 – vitamin B1



Sample: beer "X" (50 μL)
Found:
1 – nicotinamid (4.2 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)



Other beer components, which can be determined by capillary electrophoresis method are as follows:

- Inorganic anions of water in brewing processes,
- Inorganic cations of water in brewing processes,
- Organic acids (formic acid, acetic acid, and others),
- Hop and beer bitter acids (humulones and isohumulones),
- Amino acids,
- Amines (histamine, volatile alkyl amines),
- Preservatives and color additives in finished products

This application note contains only basic reference data. To obtain a more detailed information please contact Lumex ltd. at Moskovsky prospect 19, Saint-Petersburg, 190005, Russia. Tel +7 812 718-5390 Fax +7 812 316-6538.
E-mail: lumex@lumex.ru, http://www.lumex.ru

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