IDENTIFICATION AND DETERMINATION OF SYNTHETIC DYES IN ALCOHOLIC BEVERAGES

INTRODUCTION

The method allows identification and determination of synthetic dyes in samples of alcoholic beverages by capillary electrophoresis.

MEASURING METHOD

The Capillary Electrophoresis (CE) method for the determination of synthetic dyes is based on their differential migration in a narrow quartz capillary under the influence of the applied electric field. Identification and quantitative determination of dyes is performed by measuring the UV absorbance at 254 nm wavelength.

CONCENTRATION RANGES

The synthetic dyes that can be determined in alcoholic beverages using this method are listed in table below.

Type of dye	Name (C. I.)	E Numbers
Azo dyes		
	Tartrazine (C. I. 19140)	E102
	Sunset Yellow FCF (C. I. 15985)	E110
	Carmoisine (C. I. 14720)	E122
	Ponceau 4R (C. I. 16255)	E124
	Allura Red AC (C. I. 16035)	E129
	Brilliant Black BN (C. I. 28440)	E151
	Amaranth (C. I. 16185)	E123
Tritane dyes		
	Green S (C. I. 44090)	E142
	Brilliant Blue FCF (C. I. 42090)	E133
	Patent Blue V (C. I. 42051)	E131
Xanthene dyes		
	Erythrosine (C. I. 45430)	E127
Indigoid dyes		
	Indigotine (C. I. 73015)	E132

Range of measurable concentrations for all dyes is **5–200 mg/l (ppm)**. If concentration of one or several dyes is higher than the upper limit of the range, it is possible to dilute the sample by distilled water.

EQUIPMENT

The following equipment and reagents are used in measurements:

- The CAPEL® CE System with high-voltage positive polarity
- Distilled water
- Boric acid
- Borax, standard-titer, equivalent molarity 0.5 mol/l
- Sodium dodecylsulphate
- Sodium hydroxide
- Hydrochloric acid

Reagents must be of analytical grade or better.

Data acquisition, collection, processing and output are performed using a personal computer running under WINDOWS® 98/ME/NT/2000/XP operating system with installed “Chrom&Spec® for WINDOWS®” software package for acquisition and processing of chromatography data.

PREOPERATIONAL PROCEDURES

Preparation should include the following steps:

- sampling and sample pre-treatment
- preparation of solutions
- calibration of the CE system
- capillary conditioning

Sampling is done according to the existing protocol.

Sample pre-treatment should include the following steps:

- SPE of dyes from the sample
- desorption by ammonia
- subsequent evaporation of ammonia

Calibration of the CE system is done by measuring the signal of the standard solutions. The stability of calibration is controlled prior to the sequence of analysis by performing the analysis of one of the calibration solution.

The dyes are identified by analyte addition technique, which involves adding aqueous solutions of mixtures of the dyes that are expected to be found in the sample. Identification is made by comparing the migration time of each of the dye of the multi-component mixture with the migration times for corresponding standard samples.

MEASUREMENT PROCEDURE

No less than two aliquot specimens should be analyzed for each sample. Sample dilution must be done prior to analysis if the measured concentrations of dyes are higher then the upper limit of the calibration.

DATA PROCESSING

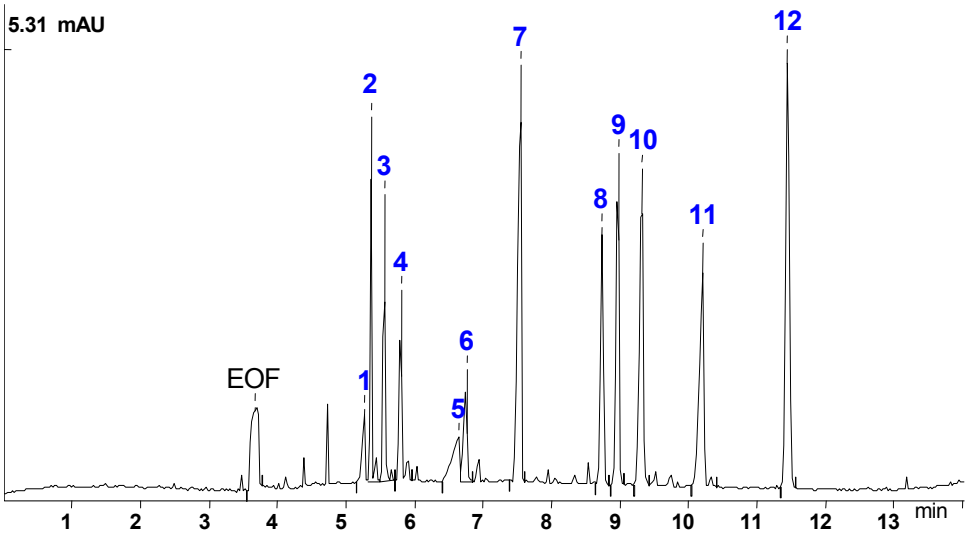
Data analysis is done by the Chrom&Spec® software. Results are expressed as a customized report where concentrations of all analyzed dyes in mg/ml are listed.

EXAMPLE OF A REAL ANALYSIS

Sample: mixed dye “330200”

Measurement results:

1 – Brilliant Blue FCF
2 – Green S
3 – Patent Blue V
4 – Erythrosine
5 – Allura Red AC
6 – Indigotine
7 – Sunset Yellow FCF
8 – Carmoisine
9 – Amaranth
10 – Ponceau 4R
11 – Brilliant Black BN
12 – Tartrazine



This application note contains only basic reference data. To obtain a more detailed information please contact Lumex Ltd. at Moskovsky pr. 19, St.Petersburg, 190005, Russia. Tel +7 812 718-5390 Fax +7 812 316-6538.
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