



SIMULTANEOUS DETERMINATION OF **INORGANIC CATIONS**, **AMINES**, AND SOME **AMINO ACIDS** IN WINES

INTRODUCTION

Aliphatic and biogenic amines (methyl-, *n*-propyl-, *iso*-butyl-amine, etc.) accumulate in wines and wine materials as a result of complex fermentation processes in which pathogenic microorganisms are involved. Presence of certain amines, especially biogenic points to the deviations in technology of wine production. Increased level of histamine and some other amines can influence the human health due to their high allergenicity.

Capillary electrophoresis enables simultaneous separation and quantification of inorganic cations (ammonium, barium, calcium, lithium, magnesium, manganese, potassium, sodium, strontium), amines, and amino acids (lysine, arginine, and histidine).

MEASUREMENT METHOD

Measurement method is based on sample dilution with subsequent components separation by capillary electrophoresis with indirect detection at 267 nm, using Capillary Electrophoresis System CAPEL[®]-105M.

MEASUREMENT RANGE

Components	Measurement range, mg/L
Methylamine, dimethylamine, ethanolamine, <i>n</i> -propylamine, <i>iso</i> -propanolamine, <i>iso</i> -buthylamine, <i>iso</i> -amylamine, diethylamine, hystamine	0.1–500
Arginine, hystidine, lysine	
Ammonium, barium, potassium, calcium, lithium, magnesium, manganese, sodium, strontium	0.5–1000

EQUIPMENT AND REAGENTS

- Capillary Electrophoresis System CAPEL[®]-105M with positive polarity;
- Standards of inorganic cation;
- Standards of amines;
- *L*-amino acids;
- Hydrochloric acid;
- Tartaric acid;
- Sodium hydroxide;
- Benzimidazole;
- 18-crown-6.

Data acquisition, collection, processing and output are performed using a personal computer running under WINDOWS[®] XP/7 operating system with installed dedicated software package ELFORUN[®].

All reagents must be of analytical grade or better.

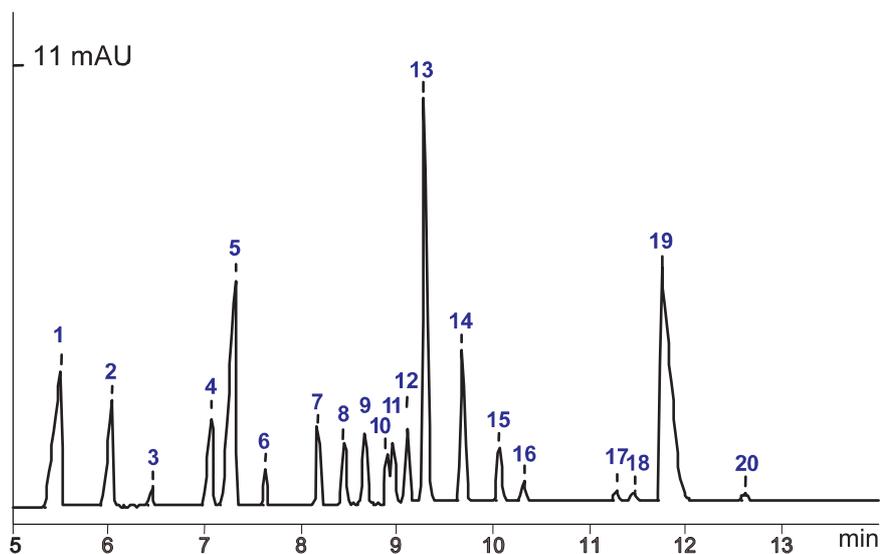
EXAMPLES OF REAL ANALYSIS

Buffer: benzimidazole with additives
Capillary: $L_{\text{eff}}/L_{\text{tot}} = 50/60$ cm, ID= 75 μm
Injection: 150 mbar*sec
Voltage: +13 kV
Detection: 267 nm, indirect



Sample: artificial mixture of inorganic cations, amino acids, and amines

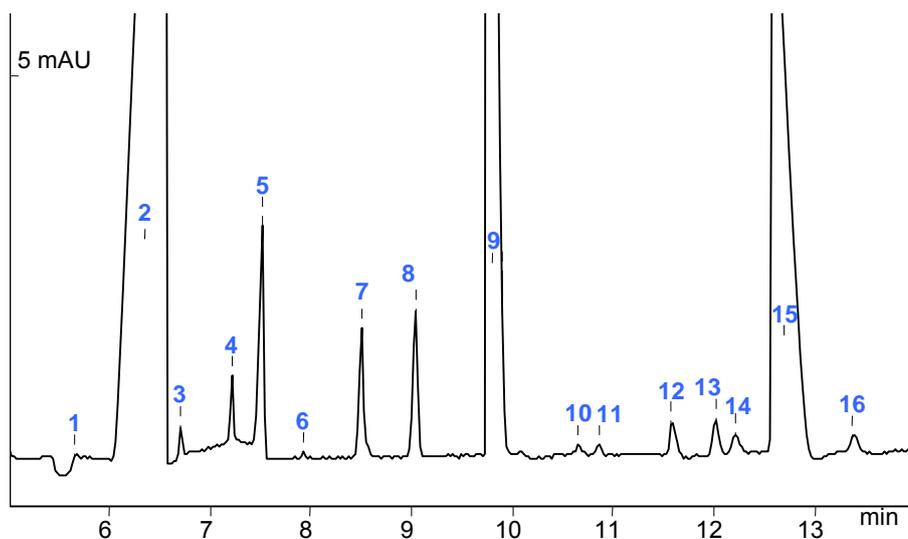
- 1 – ammonium
- 2 – potassium
- 3 – methylamine
- 4 – dimethylamine
- 5 – sodium
- 6 – histamine
- 7 – ethanolamine
- 8 – *n*-propylamine
- 9 – lithium
- 10 – diethylamine
- 11 – *iso*-propanolamine
- 12 – *iso*-butylamine
- 13 – magnesium
- 14 – *iso*-amylamine
- 15 – strontium
- 16 – barium
- 17 – lysine
- 18 – arginine
- 19 – calcium
- 20 – histidine



Sample: dry red wine

Found (mg/L):

- 1 – ammonium (0.6)
- 2 – potassium (820)
- 3 – methylamine (3.3)
- 4 – dimethylamine (12)
- 5 – sodium (14)
- 6 – histamine (0.9)
- 7 – *n*-propylamine (19)
- 8 – lithium (1.0)
- 9 – magnesium (100)
- 10 – strontium (0.7)
- 11 – barium (0,7)
- 12 – unknown component
- 13 – lysine (9.2)
- 14 – arginine (6.9)
- 15 – calcium (72)
- 16 – histidine (5.6)



The contents on this paper are subject to change without notice.