

CAPILLARY ELECTROPHORESIS SYSTEM CAPEL[®]-105M



METHOD

High performance capillary electrophoresis (HPCE)

PRINCIPLE OF OPERATION

Based on the differential migration of components of aqueous samples within a narrow fused silica capillary under the influence of the applied electric field. Separated solutes are quantitatively detected at the capillary outlet by high sensitive optical system based on direct or indirect UV absorbance.

ADVANTAGES OF CAPEL[®]-105M

Features	Benefits
Complete control of the instrument from a PC	User friendliness
Highly efficient capillary liquid cooling	Extended range of applied buffers, increased efficiency in separation
Powerful software package "Elforun [®] "	<ul style="list-style-type: none"> Increased flexibility in performing analyses of various complexity Any kind of complex runs are possible including those with pre-programming of changes in analysis conditions Customized report, data export to other programs
Extended instrumental options	<ul style="list-style-type: none"> Spectra scanning facilitates peak identification Broad range of controlled pressure injection permits analysis of viscous samples Ability to apply vacuum for sample injection results in ultra short analysis time (less than 1 min) and permits sample stacking to decrease limit of detection
Substantially modified capillary cassette	<ul style="list-style-type: none"> Easy capillary change just in a few minutes Lower detection limit due to the optimized optical scheme



LUMEX

ADVANTAGES OF HPCE METHOD

- Unique separation power (up to 1000000 TP)
- Extremely low reagents and samples consumption
- Very low analysis cost
- Fast analysis time

APPLICATIONS

Environmental analysis	<ul style="list-style-type: none"> · Drinking, natural and waste water (Br^-, I^- and other inorganic and organic ions)
Quality control of foodstuffs and beverages	<ul style="list-style-type: none"> · Mineral and bottled water (inorganic cations and anions) · Beverages and juices (inorganic cations and anions, sweeteners, antioxidants, vitamins, organic acids) · Wines, cognacs, brandies and vodkas (inorganic cations and anions, aromatic aldehydes, organic acids, phenolcarboxylic acids, amino acids) · Beer (inorganic cations and anions, hop and beer bitter acids (humulones and isohumulones), amino acids, organic acids, vitamins) · Tea, coffee (theanine, caffeine, polyphenols) · Foodstuff (amino acids, synthetic dyes, organic acids, amines, proteins, melamine)
Pharmacology	<ul style="list-style-type: none"> · Technological monitoring and patent medicines analysis · Enantiomers separation
Biochemistry	<ul style="list-style-type: none"> · Determination of inorganic cations and anions, amino acids and proteins in biological fluids · Quality control of therapeutic recombinant proteins · Pharmacokinetics studies · Protein separation
Forensic studies	<ul style="list-style-type: none"> · Analysis of explosives and trace detection · Drugs analysis · Analysis of writing paper components
Chemical industry	<ul style="list-style-type: none"> · Technological monitoring · Composition determination of raw material and intermediate products

EQUIPMENT AND OPTIONS

- Capillary electrophoresis system CAPEL®-105M
- Spare capillary cassette
- Elforun® software package
- Kits for analysis [by request]; most of CE-kits of other manufacturers are compatible with CAPEL®-105M

SPECIFICATIONS

Detection wavelength	190–380 nm, light source – deuterium lamp
Analysis	Constant voltage 1 – 25 kV in 1kV steps, manual polarity switching, current 0 – 200 μA , pressure 1 – 99 mbar, programmable changing of wavelength, pressure and voltage during analysis
Injection	By voltage 1 – 25 kV; by pressure 1 – 99 mbar
Rinsing	By pressure, 1000 mbar
Capillary	Length/Internal diameter: 30 – 100 cm/50, 75, 100 μm
Capillary cooling	Liquid cooling with thermostabilisation, from –10 up to + 30 °C with respect to ambient
Sampler	Autosamplers for 10 inlet and 10 outlet vials
Power requirements	110/220 Vac, 50/60 Hz
Power consumption	200 W
Dimensions/Weight	500x500x500 mm, 25kg
Control	Elforun software

WARRANTY

All CAPEL® HPCE systems are covered by a 12-month warranty.

SERVICES

Installation and commissioning of LUMEX instruments can be carried out at a Customer's site by our service engineers. Personnel training specific to the Customer needs can be also provided. Free delivery of spare parts and repair of the instruments are provided within the warranty period.

The information and specifications in this publication are subject to change without notice.



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LUMEX INSTRUMENTS



LUMEX ANALYTICAL INSTRUMENTS AND APPLICATION PROTOCOLS FOR ANALYSES IN OENOLOGY

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Lumex Instruments is present on the market of analytical instrumentation for more than 20 years. During these years, Lumex has gained extensive experience in different fields of analyses with a special emphasis on food and beverage analyses. This knowledge allows us to offer the most efficient and reliable protocols for the determination of various important components in food and beverage matrices.

Below is what Lumex offers to oenological laboratories:

- Kits with detailed analytical protocols, most of them are National Standards
- Capillary electrophoresis system CAPEL®-105M to implement these protocols.

The International Organization of Vine and Wine (OIV) has included capillary electrophoresis in the list of analytical methods which are recommended to be used in oenology.

The following actual analytical tasks in modern wine-making industry can be carried out using Lumex developments:

- Safety and quality control of raw material and final products.
- Confirmation of authenticity or counterfeit.
- Quality control of water used for production of beverages.
- Process control of beverage production.

All Lumex analytical protocols, which are implemented on the basis of capillary electrophoresis method, have many common advantages:

- Very short analysis time, normally 4–6 min and, consequently, high throughput.
- Numerous compounds are quantified in a single analysis.
- Proposed method is very precise and highly reliable as compared with other analytical approaches.
- Very low reagent consumption, normally 3–5 ml per day.
- Very simple sample pre-treatment, normally just dilution and degassing.
- Very low analysis cost.

The following components can be determined in wines, wine materials, brandy, spirits and wood extracts using Lumex analytical protocols and instrument CAPEL®-105M:

- **Organic acids** (tartaric, malic, succinic, citric, acetic, lactic, formic, oxalic, etc)
- **Aromatic aldehydes** (coniferaldehyde, sinapaldehyde, syringaldehyde, vanillin)
- **Furfural derivatives** (furfural, 5-methylfurfural, 5-hydroxy-methylfurfural)
- **Inorganic cations** either in water used for beverage production or directly in wine (ammonium, potassium, sodium, magnesium, calcium, iron, etc.)
- **Inorganic anions** either in water used for beverage production or directly in wine (chloride, bromide, nitrite, nitrate, sulphate, fluoride, phosphate)

- **Biogenic amines** (cadaverine, putrescine, histamine, tyramine)
- **Preservatives and antioxidants** (sorbic acid, benzoic acid, ascorbic acid)
- **Amino acids**
- **Sugars** (glucose, saccharose, fructose)
- **Synthetic dyes**
- **Pesticides**

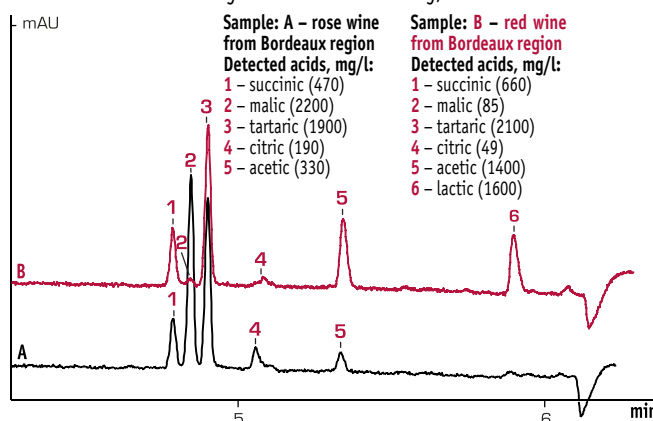
Some examples of real analyses are given below.

ORGANIC ACIDS, VOLATILE ACIDITY

Organic acids profile in wines at different stages of their production can be highly informative since it reveals the important features of technological process. Alcoholic fermentation, malolactic fermentation, wine maturation, bacterial contamination – all these processes can be followed by analysing organic acids profile. Besides, it is one of the most important criteria of wine authentication.

Lumex offers an **Organic Acids Chemical Kit** with analytical protocol, which gives complete information about almost all organic acids in just 5–6 minutes. The kit also allows simultaneous determining some other acids, like ascorbic, benzoic and sorbic acids.

As volatile acidity in wines can be attributed by more than 98% to the amount of acetic and formic acids, this parameter can be also quantified with this kit just by quantifying the corresponding acids. Thus, very laborious and time consuming distillation stage, required for the "classical" analysis of volatile acidity, is eliminated.



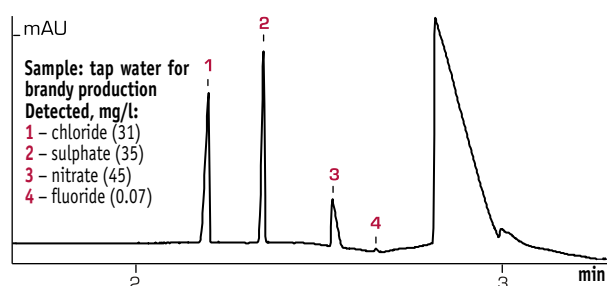
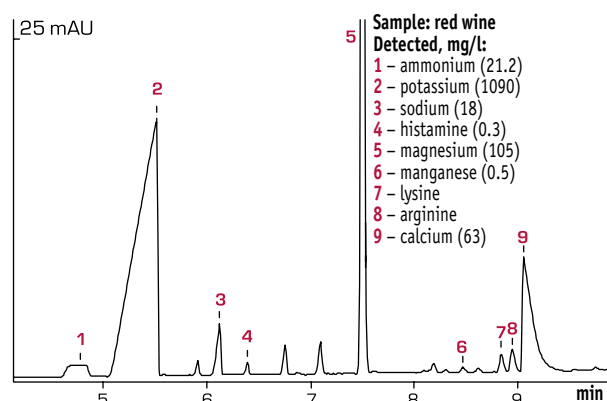
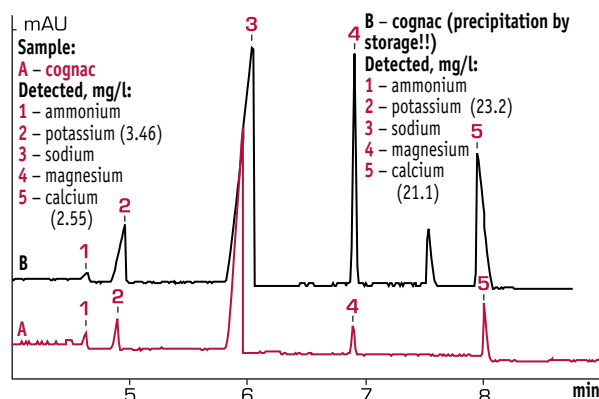
Lumex analytical protocol for the analysis of organic acids was recently acknowledged by the French Accreditation Committee COFRAC.

INORGANIC CATIONS AND ANIONS

Lumex analytical protocols, included in **Cations Analysis Chemical Kit** and **Anions Analysis Chemical Kit** provide determination of all most important inorganic ions either directly in wine and brandies or in water used for the production of alcoholic beverages. Detailed

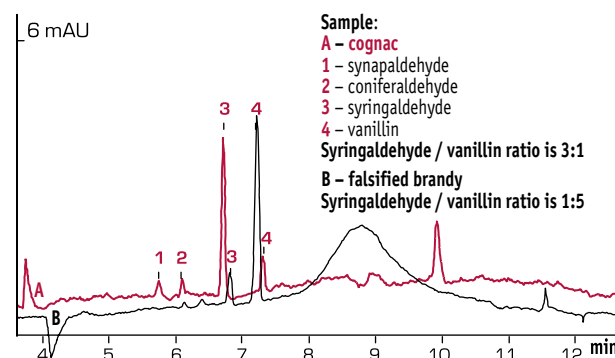
information about the ion content is highly important, since it helps in proving the authenticity or falsification of the product and can point out deviation in production technology. Furthermore, it helps estimate the capability of the final product to avoid precipitation, thereby predicting the safety storage time.

Cations Analysis Chemical Kit also allows determination of some amines and two important aminoacids simultaneously with inorganic cations. Especially the amounts of biogenic amines (putrescine, cadaverine, histamine, and tyramine) are very informative, because their presence reveals severe deviations in production technology and indicates the product spoiling.



AROMATIC ALDEHYDES

Aromatic aldehydes are very important nonvolatile components of brandy, cognac, whiskey, rum etc. Their amounts in cognacs can serve as the age criteria of the product since their accumulation is due to the storage of corresponding spirits in oak barrels. As all four aldehydes must be always present in cognac and as the ratio between two of them, syringaldehyde and vanillin, is known to be within certain range, this analysis helps significantly with identifying of counterfeit. Lumex analytical protocol enables aldehydes determination with the sensitivity better than that of the HPLC method.



SUGARS

Content of sugars is one of the most important oenological parameter. Its level in wines and spirits is regulated by the international norms. All three important sugar species – glucose, fructose and saccharose – can be determined in one run using Lumex analytical protocol. Moreover, other sugars like xylose, maltose and lactose can be also quantified within this protocol.

